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THE AUTOMOBILE MAGAZINE

JUNE, 1901

On the Oyster Bay Road

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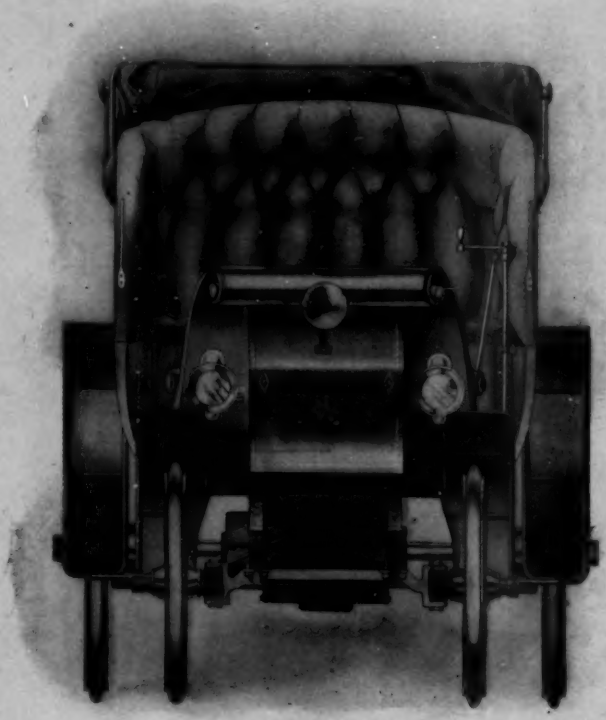
VOLUME III NUMBER 6

Clinton E. Woods

Automobiles



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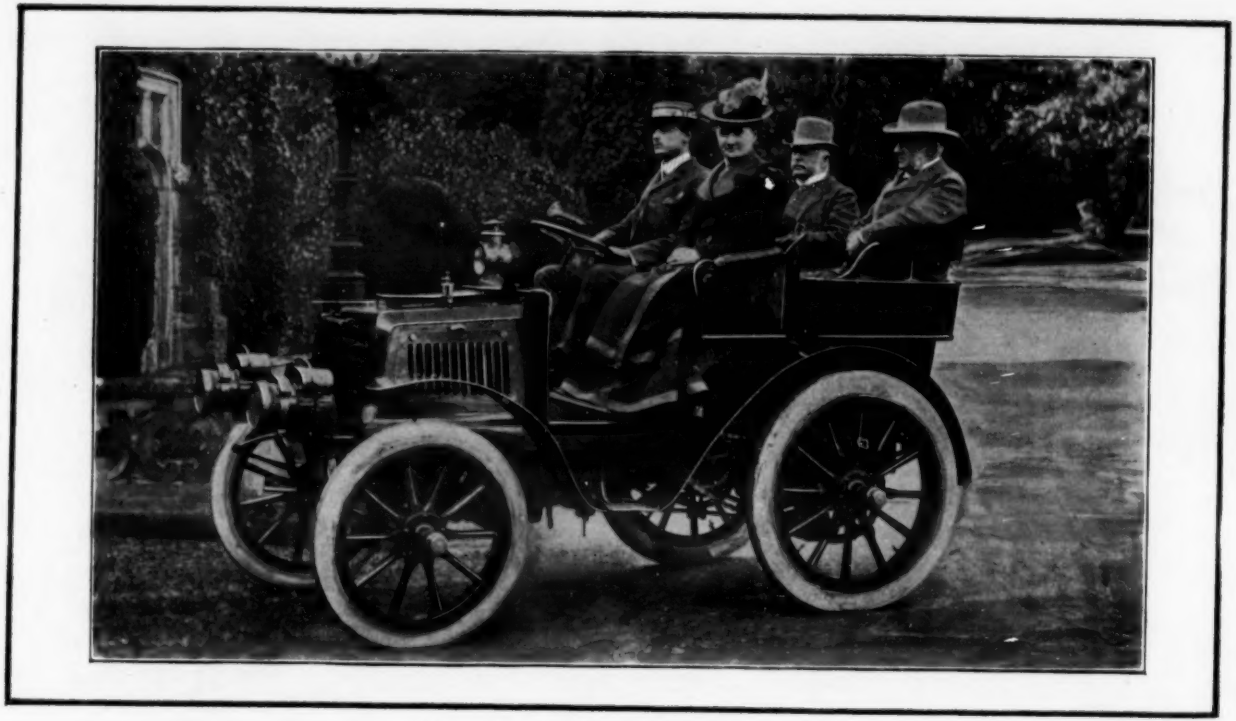


Hon. C. S. Rolls at the Steering Wheel

THE AUTOMOBILE MAGAZINE

VOL. III JUNE, 1901 No. 6

The Great International Event

OUR frontispiece this month shows Hon. C. S. Rolls and friends. The honorable gentleman is one of the foremost automobilists in Europe and few races or contests have been held either in France or England in which he has not had some part.

The illustration is opportune, as in the forthcoming Gordon-Bennett Cup Race between Paris and Bordeaux, which is spoken of as the Derby of automobiling, Mr. Rolls is to be one of England's representatives. The car which Mr. Rolls will drive on that occasion is a vehicle of unusual power, a 50 horse-power Napier. He is recognized as a driver of extraordinary ability. Recently with Mr. Sennet he traversed the course for the purpose of becoming familiar with it. They rode in a 24 horse-power Mors, which was occasionally driven at the rate of a mile a minute.

The distance between Paris and Bordeaux is about 800 miles.

For the photograph we are indebted to Mrs. M. E. Kennard. The others seated in the car, which is a 12 horse-power Daimler and the winner of the 1900 one-thousand mile trial held in England, are Lord and Lady Llangattock and Lord Brassey.

We as Americans would of course be much more interested in this great international event if an American vehicle had been entered. Nevertheless, all automobilists in this country will be interested in the race and its result, together with the points of weakness it may reveal in existing types of automobiles.

At the Storage Station

By I. B. RICH

"WHAT'S the matter with you, Puffer," said a staid old electric omnibus to the little steam runabout that had just been brought in by a rather reckless young man.

"Matter enough," growled the boiler. "Some men don't know specially anything 'bout steam or motors of any kind. May be all right with you where all the jay has to do is to push a handle and steer—but it's different with steam," and the safety valve popped to relieve its pent-up feelings.

"Hear him sputter," remarked one of the gasoliners—"guess the driver warmed up his crankpin. That's the way with these little light machines—nothing but toys, anyhow," and the steering wheel gave a little twist of satisfaction. "Now with me," he went on, "there isn't any boiler to blow off or up, or any fire to blow out or blaze up. Just give me a little compression in one cylinder and away we go."

"When your old spark plug don't blow out, or your battery give out, or your carbureter go on strike and give you the wrong medicine. Must be you forgot the time I sailed by you on the Merrick road last summer when your owner couldn't get a cough out of your old cylinder to save his life. Made me laugh, to see a man with his money—enough to buy two like me—lying on his back in the road under an old gasoline saw mill trying to put in a gasket so you'd hold your compression long enough to get a kick out of you. Don't go jolly the little one when you've got so much to answer for yourself," and the electric Stanhope almost buckled a plate as he thought of it.

"Yes, I remember that day too," retorted the gasoliner. "The alleged repair man who overhauled me just before didn't put in a good gasket nor tighten it up either. Half of these repair men don't know enough to grease a baby carriage. But I remember something else, too, you high and mighty electricity buzzer. Some of your connections came loose and short-circuited your battery just about two miles beyond. There one of the "locos" towed you ten miles to get some more juice pumped into you. That's why you like to stand up

for Puffer and his tribe, eh? Well, I don't blame you—might pay you to carry one with you to tow you home when you need it, and that's often enough, everybody knows."

"What are you youngsters kicking about, anyway," said an old Duryea. "Now, I've been on the road long enough to see every kind of a machine yet built, break down—been out of gear myself, too, many a time. When you get a machine with as many parts that must fit and work together as well as in an automobile, you've got a machine that is bound to wear some, get out of order once in awhile and especially when its handled by anybody with cash enough to buy or hire one. Why, I've had some men handle me that didn't know a monkey wrench from a buzz saw. They'd flood me with cylinder oil, starve me on gasoline or air and never think of cleaning my spark points. They never ease up on speed till they have to slap on the brake so as not to go over sideways. But there's no use in kicking each other—every one of us has faults of our own, and each has some special field where it beats anything else—now, don't all get red in the face over that or your gasoline tanks may go up."

"Guess your right, grandpa," chuckled a new steam carriage, whose top was still up—had evidently been left up by the owner for reasons best known to himself—"but, say, you ought to have been with me this afternoon. My owner's a pretty sensible sort of a chap, but there are times when he gets rattled. To-day was one of 'em, and by all my boiler tubes I don't blame him much. He had the prettiest girl I've ever carried—and that's saying a good deal, for I've been in more spooning scrapes than any two of you, I'll bet. Well, she was a beauty and no mistake. Brown eyes and hair and just the nicest all around girl my gages ever looked at. Both of 'em got so rattled they didn't know which was steam and which air. Billy—that's my owner—usually goes out on the Old Post road and lets me spin to show my points to the admiring damsels, and then—if there's any spooning on the program—he winds up in one of the byways, where 'leafy branches meet,' etc. Leastwise, that's what I've heard him call it, and I guess he knows. But 'twas different to-day. We headed right for the woods, so to speak, and I knew something was up sure. Kinder made me mad, too, 'cause he didn't seem to care whether I went fast or slow—never let me out at all. First thing I knew they were billing and cooing like two turtle doves, with the top up so no one behind could tell whether I was a one-hand or a two-hand machine—but Billy knows it's two, with a big T. Billy was nervous.

Couldn't seem to say what he wanted to. As we slowed down still more I heard, 'Edith—er. I beg your pardon, Miss Edith—no I'll be hanged if I call you Miss—I've a—er—question—' That's as far as he got that time, for just then we hit a rock. That jerked the steering handle out of his hand, and the way he grabbed for that and tried to shut off steam at the same time was a caution. But fortune was on his side and we were soon on the road again. Then the fire blew out, and he had troubles of his own for awhile. If he hadn't have known Edith couldn't get away he'd have been more nervous; but I guess he wanted to show her how he could act under difficulties. Then everything went swimmingly, and we soon struck another secluded spot where he slowed down to resume operations in the matrimonial line. 'Edith—er—as I started to say before, when this measly thing shied at that rock—er—I have a question to ask you—er—a—momentous question that will affect my life's——' Brrrrrr—brrrrrr—pop—went the safety valve. 'Drat that pop valve,' he muttered, half under his breath, but she heard him.

"'It's only trying to help you, Billy,' and she looked down demurely at the air gage.

"'Don't see how—making such a noise I can't think, let alone talk.'

"'Why—er—showing you how to pop, you know.'

"Well, I don't know just what happened, but the throttle shut with a bang, the brake went on in a hurry and we stopped plumb in the middle of the road. How long we stopped I don't know, but we didn't start till a farmer came along on a hay wagon and yelled out, 'air ye stuck with that blame old sausage machine.' This brought him back to earth, and we came home without a stop. That's why he looked so good natured when he helped her out, and forgot to kick about the burners going out."

"That was rather a mean trick," ventured the auto-tricycle. "I wouldn't try to break up a spooning bee that way—let 'em enjoy life while they're young."

"Just listen to the corn popper; he'd have a good time breaking up any kind of a match with only one seat, and that narrow gage."

With that they settled down for the night, and the goddess of gasoline drew her mantle of vapor over the motley crowd.

The Late Mr. Tousey

IT was with feelings of profound regret that we learned of the recent death of Fred. W. Tousey, the late Assistant Secretary of the Automobile Club of America. We are pleased to present herewith, a portrait taken not very long before he passed away, and feel assured that many of our readers will be interested to know something of his career.

Mr. Tousey was born in Long Hill, Conn., in 1872. He was educated at the Park Avenue Institute, Bridgeport, after which he took a course at the Eastman Business College, from which he graduated in 1892. From there he took a position in the Second National Bank of New York, where he remained two years, leaving to join his brother-in-law, Henry A. House, Jr., in the manufacture of steam launches and steam cars, in Cowes, Isle of Wight, England. Through the liquidation of the firm, he left to become Assistant Secretary of the Automobile Club of Great Britain, of which he was a founder and member, helping largely to organize the 1,000 mile trial which took place last year. After his work connected with the trial was completed, he decided to come back to America, arriving here on September 11, 1900, after six years' absence. He accepted the position of Assistant Secretary of the Automobile Club of America. He was an enthusiastic automobilist and looked forward to a great future for the automobile industry. He was busily engaged arranging and organizing the endurance test to Buffalo when he was taken ill the day after the opening of the new rooms at Fifty-eighth Street and Fifth Avenue,

The Late Fred. W. Tousey.

with pneumonia. After recovering from that, a complication settled in his throat, which finally developed into tubercular laryngitis, from which he succumbed on April 22, in his twenty-ninth year. He was married in England in September, 1896, and leaves a widow and two small children. His funeral took place at Long Hill Cemetery, April 25, 1901.

The deceased was one, who although comparatively a stranger to American automobilists, had since his return to his native land last Autumn, made many friends. Quiet, unassuming, yet of kindly disposition. We had hoped he would recover and do further good service in the cause of automobilism. He was a close student of the automobile industry, and took great interest in its development. His widow desires, through the columns of THE AUTOMOBILE MAGAZINE, to express her gratitude to the Automobile Club of America, for the great kindnesses and beautiful flowers received in her time of bereavement.

Speed Law in Connecticut

THE State Legislature of Connecticut has reported a bill intended to govern the speed of automobiles in that State. It provides that no vehicle shall be driven more than 15 miles per hour when outside city limits, and not to exceed 12 miles in the city. It also provides that speed shall be reduced when approaching a crossing. No city, town or borough shall have any power to make any ordinance, by-law or resolution respecting the speed of motor vehicles, and no ordinance, by-law or resolution heretofore or hereafter made by any city, town or borough in respect to motor vehicles shall have any force or effect. The mayor of a city, the selectmen of any town or the warden of a borough may, on a special occasion, grant a permit to run motor vehicles at any rate of speed they may deem proper. The penalty for violation of this law must not exceed $200.

"What will people say of this new motor carriage?" "Why," answered the Pop-Eyed idiot, "it goes without saying."

—*Motor World.*

A Vexing Question

Good-bye, my horse, we part at last,
So faithful have you been, and noble,
Your days of usefulness are past,
I swap you for an automo*ble!*

Or, have I blundered in the name?
I never can remember well,
Perchance I should have called the same
My newly purchased automo*bell!*

I wish I could remember, now,
Which name is just the proper style,
'Tis bothersome, you must allow,
Perhaps 'tis called automo*byle!*

By Jove! that doesn't sound correct,
And, anyhow, I seem to feel,
As more about it I reflect,
As though it was automo*beel!*

Now, I'm not sure, I ought to know,
But there! I don't and never will,
And yet it seems to me as though
It should be called automo*bill!*

'Tis beel or bill or byle or bell,
Or it's something just as silly,
Now wouldn't it be just as well
To call it automo*billy?*

If I should try that word once more
'Twould drive me crazy as a coot!
So I will call the struggle o'er
And "horseless carriage" substitute.

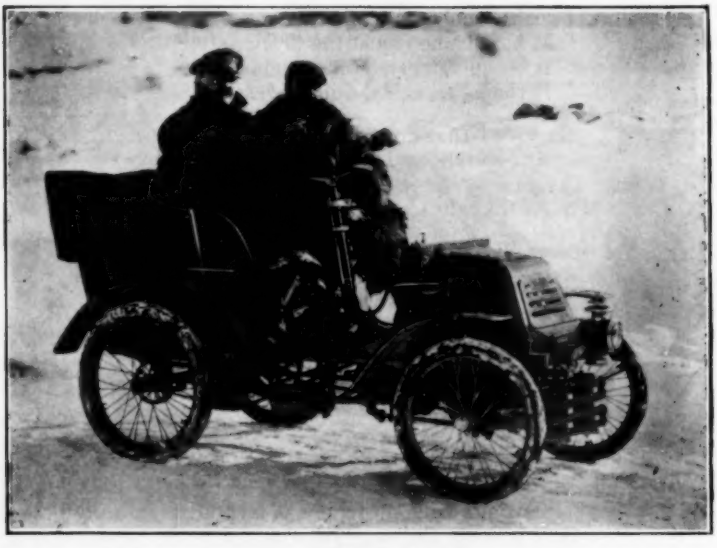
LEWIS A. BROWNE.

The Remington Automobile and Motor Company of Ilion, N. Y., reports that its business has recently increased to such proportions as to compel removal to larger quarters. They have decided to move to 43 First Street, Utica. This is a three-story building. Modern machinery will be installed.

A Wintry Picture

THE accompanying illustration is of Alexander de Bottary, who is a member of the Automobile Club of Belgium and also the Touring Club of France. Recently he went from Paris to Turin in forty hours. He used an automobile called the "Liberia," built by G. Dupont, of Paris.

The photograph was taken while he and his companion were passing through the Albarine Valley. The temperature at the time



M. Bottary. Temperature 19°

was 19° Centigrade below zero. The picture possesses interest as showing the inroads self-propelled vehicles are making in all parts of the world and over roads where a very short time ago it was said by a great many, automobiles would never dare to pass. Judging by the picture, the climate was not by any means conducive to satisfactory running of automobiles owing to the intense cold, still our correspondent reports that he had no trouble at any time owing to freezing up.

Automobile Bill Signed by Governor Odell

THE automobile bill, drafted by the law committee of the Automobile Club of America, and presented to the legislature by Mr. Doughty, has been signed by Governor Odell. In its final form the law differs in some respects from the original draft. It might be of interest to readers to know just what this bill covers, and below is given the text as it at present stands. This law is in force throughout the State of New York :

Steam Traction Engines on Highways—The owner of a carriage, vehicle or engine propelled by steam, his servant or agent, shall not allow, permit or use the same to pass over, through or upon any public highway or street, except upon railroad tracks, unless such owners, or their agents or servants, shall send before the same a person of mature age at least one-eighth of a mile in advance, who shall notify and warn persons traveling or using such highway or street, with horses or other domestic animals, of the approach of such carriage, vehicle or engine ; and at night such person shall carry a red light, except in incorporated villages and cities. (This section shall not apply to any carriage or motor vehicle, propelled by steam, developing less than 25 horse-power, other than a steam traction engine.)

Entitled to Free Use of Highways—The commissioners, trustees, or other authorities having charge or control of any highway, public street, park, parkway, driveway or place, shall have no power or authority to pass, enforce, or maintain any ordinance, rule or regulation by which any person using a bicycle or tricycle, an automobile or motor vehicle, whether the same be propelled by steam, gasoline, electricity, or other source of energy, shall be excluded or prohibited from the free use of any highway, public street, avenue, roadway, driveway, park, parkway or place, at any time when the same is open to the free use of persons having and using other pleasure carriages, except upon such driveway, speedway or road as has been or may be expressly set apart by law for the exclusive use of horses and light carriages. The board of supervisors of any county may adopt ordinances regulating the speed of automobiles or motor vehicles on the highways or streets of such county, outside the limits of cities. No ordinance, rule or regulation adopted by the authorities of any municipality in pursuance of this section or of any other law, shall require an automobile or mo-

tor vehicle to travel at a slower rate of speed than eight miles per hour, within any city, town or village of the State in the built-up portions thereof, nor at a slower speed than fifteen miles per hour where the same are not built up. An ordinance adopted by a board of supervisors in pursuance of this section, regulating the rate of speed of automobiles or motor vehicles on the highways or streets of such county outside of cities shall supersede any such ordinance in such county adopted by the authorities of a town or village. But nothing herein shall prevent the passage, enforcement or maintenance of any regulation, ordinance or rule, regulating the use of bicycles or tricycles in highways, public streets, driveways, parkways and places, or the regulation of the speed of carriages, vehicles, engines, automobiles or other motor vehicles in public parks and upon parkways and driveways in the city of New York, under the exclusive jurisdiction and control of the department of parks of said city, nor prevent any such commissioners, trustees, or other authorities in any other city from regulating the speed of any vehicle herein described in such manner as to limit and determine the proper rate of speed with which such vehicles may be propelled, nor in such manner as to require, direct or prohibit the use of bells, lamps and other appurtenances, nor to prohibit the use of any vehicle upon that of the highway, street or parkway, commonly known as the footpath or sidewalk.

Section 166 provides for registration, viz.:

Registration by Owners of Automobiles—Every owner of an automobile or motor vehicle shall, within thirty days after the amendment to this section takes effect, file in the office of the Secretary of State a statement of his name and address, with a brief description of the character of such vehicle, and shall pay to the Secretary of State a registration fee of $1. The Secretary of State shall issue to such person a certificate, stating that he has registered in accordance with this section, and shall cause the names of such persons to be entered in alphabetical order in a book kept for such purpose. Every person hereafter acquiring an automobile or motor vehicle shall, within ten days after acquiring the same, register with the Secretary of State as required by this section. This section shall not apply to a person manufacturing or dealing in automobiles or motor vehicles, except those for his own private use.

Section 167, On the Use of Highways by Automobiles, formerly numbered 166, has been altered to the negative, now reading as follows:

No person driving or in charge of an automobile or motor vehicle on any street, avenue, parkway or driveway in this State, shall drive the same at any speed greater than is reasonable and proper, having regard to the traffic and use of the highway, or so as to endanger the life or limb of any person.

Sec. 168. Brakes and Lamps on Automobiles—Every automobile or motor vehicle shall be provided with good and efficient brakes, and shall also be provided with a suitable bell, horn or other signal. Every automobile or similar motor vehicle shall be so constructed as to exhibit during the period from one hour after sunset to one hour before sunrise, two lamps showing white lights visible within a reasonable distance in the direction toward which the automobile is proceeding, and shall also exhibit a red light visible in the reverse direction. The lamps shall be so placed as to be free from obstruction to light from other parts of said automobile or motor vehicle.

Sec. 169. Stop Automobile on Signal—Every person driving an automobile or motor vehicle shall at request or signal by putting up the hand, from a person driving or riding a restive horse or horses, or driving domestic animals, cause the automobile to immediately stop and to remain stationary, so long as may be necessary to allow said horses or domestic animals to pass. This provision shall apply to automobiles going either in the same or in an opposite direction.

Sec. 169a. Licenses or Permits for Automobiles—Any person owning or operating an automobile or motor vehicle, whether the motive power of the same be electricity, steam, gasoline or other source of energy, except such as are used for public hacks, trucks or other vehicles for hire, shall not be required to obtain any license or permit pursuant to the provisions of any local or municipal resolution or ordinance, or the rules or regulations of any commissioners, trustees, supervisors or other authorities having charge or control of any highway, public street, parkway, driveway or place, or pursuant to the provision of any municipal charter or any other statute, except as herein contained. Every such automobile or motor vehicle shall have the separate initials of the owner's name placed upon the back thereof in a conspicuous place, the letters forming such initials to be at least 3 inches in height.

Sec. 169b. Penalties—The penalty for violating any of the provisions of Section 163 or Sections 166 to 169a, both inclusive, relating to automobiles or motor vehicles propelled by electricity, steam, gasoline or other source of energy, shall be not exceeding $25.

It Might Have Been

(A NARROW ESCAPE IN A MOTOR)

By A. LENALIE

QUICKLY begun, and just as quickly ended, generally, are the companionships formed by summer outings at some mountain or seaside resort, journeying about by the same stages, visiting the same places of interest and, sooner or later, meeting again at the same hotels.

Early last summer, sojourning in the White Mountains, Fate thus united my lot pleasantly, for a brief time, with a party of four whose meanderings were guided by the caprice of the moment, as were mine: Captain M—— and his good wife, with a pretty young Englishwoman whom they were chaperoning, and a clergyman of Boston.

On a certain bright day, when we had planned a jaunt to the summit from Glen-Ellis, where we had been staying, behold us then: the ladies comfortably ascending the intervening eight miles in the Captain's capacious motor carriage which he was experimenting with on mountain roads, while we climbed, by way of the old bridle-path, over the last four miles above the halfway point to the summit—the Captain to rest his cramped limbs, and I in hopes of discovering a mountain blossom for the blue-eyed English girl.

After a hard but invigorating scramble we arrived to find the ladies, who had shed the dust of travel and assumed fresh toilets, watching from the very highest rock-point at the top, a storm which had gathered in the mountains below; its black cloud-masses obscured every feature of the lower landscape till Mt. Washington and the adjacent peaks seemed floating in a fuliginous sea of cloud-caps, whence arose a triple rainbow—the central, luminous arch reflecting two dimmer ones, each of which emanated midway of the first one: a radiant spanned bridge of spectrum colors, whose foundations rested on these abyssmal depths of storm-clouds wherein might well be buried the fabled pots of gold which rainbows lead to. Seeming thus to stand on the rim of the world, watching the formation of other worlds in space, we were all silenced in the presence of this magic glory till the heaven-born arches had dimmed out, and the sun, scattering the mist-wraiths, brought to view again the familiar landscape-features below.

Then, turning towards the hotel, each voiced his sentiments of the unusual spectacle he had witnessed, and, as I listened to the others, I hummed the *O que los mountagne!* of the Pyrenean shepherd who wished the mountains to stoop that he might look at his beloved—reminded of it, perhaps, at sight of the chauffeur whom the Captain had brought from abroad with him and who was formerly a mountaineer from those regions; he was just then busily engaged at the rear of the stables overhauling the motor to assure himself of its condition before attempting the home descent, and, stopping a moment to observe him, I was struck with renewed interest by the expression of subdued melancholy in his stern eyes; I had remarked this before as being unusual in one so young and of his origin.

Having thoroughly satisfied our vigorous mountain appetites we departed from the Summit House in a rosy sunset that turned every window, and the icy-coated rocks and outer walls, to a vivid, incandescent flame and bathed the mountain sides in its warm departing glow, while the guests watched the careful manipulations of our dexterous chauffeur with evident approval and the interest that still attaches to the motor carriage as a recent factor in touring.

Many a belated foot passenger we passed, doing his regulation pace of four miles an hour, hurrying upward to attain the summit before the darkness should overtake him; and, in a convenient width of road, awaited the coming of the stage, drawn by its powerful white horses, with much clanking of harness, and snapping of whip by the bronzed driver who regarded us somewhat askance as invaders of his territory; then the laughing voices of the passengers followed us into the darkening night that fell softly, wrapping us in deep shadows, till the moon, somewhat dim at first, shed its vague light over crest and ravine like a silvery mist swayed by the light breeze.

We had arranged ourselves in the carriage as best suited all parties: the clergyman and the Captain's wife, both inclined to corpulency and somewhat somnolent from the effects of the hearty meal of which they had partaken, remaining silent and half nodding when the equalities of the road permitted,—while facing them, the gallant Captain and his insular guest conversed vivaciously on the comparative merits of different motors and their various propelling forces. I, according to my usual habit, had mounted in front with the chauffeur, no other place seeming so well adapted to enjoy the scenery, even in the night with its obscure impressions. The whole route seemed cut out from rock here, bordered by continuously precipitous sides, with

sudden zigzags where the tilted motor veered and twisted in their brusque turns, causing consequent sudden lapses in the Captain's animated flow of speech—and muffled exclamations from the rudely awakened dozers. But this chauffeur, who had once handled the reins so deftly in his mountain districts,—and there are only the drivers of troïkas at Moscow who can compare with them for combined audacity and surety,—was equally cautious and expert in handling this motor.

He was a muscular, finely-built youth, contrary to the natives of his land, who are usually small-boned and short of stature. His features were clear-cut and indicative of energy, his mouth fine-lined and firm, shaded by a small moustache ; the eyes brilliant, yet of rather sombre expression. From the first he had remained utterly silent, and I gave full encouragement to this attitude, since I had chosen my seat, not only to dream and watch by the way, but also to avoid the insipid talk of my co-excursionists. I had noticed, too, that he was entirely exempt from the obsequious smile of his kind and had appeared to appreciate my own discretion in not inviting conversation. His serious, watchful gaze never left the road and the guiding of the machine, and no sound escaped his lips save a muttered interjection, now and again, in his own language, at some unwonted happening or narrow defile. My attention had been arrested often by a perceptible, smouldering gleam in the depths of his dark eyes, heavily shaded by long lashes, and the vision of his manly countenance, clouded by an expression of suffering that had appealed to me when observing him, now haunted me, the melancholy of his features seeming more accentuated in the moonlight that effaced detail of outlines, leaving the character impressions in massed relief. So, at length, it was I, who, stirred by some vague curiosity, evoked by the starry night so propitious to confidences, broke the silence.

"The women are very beautiful in your country," I said, venturing the first thought that came to me.

"Yes, *very* beautiful—at least some of them," he replied, with a low voice.

I waited but he said no more ; this was not sufficient to gratify my curiosity and I proceeded, hoping for better results :

"They seem, too, to be pleasant and kind."

"O, as to that,—something more might be added"—he replied quickly, with a bitter smile and a slight shrug of the shoulders. "O, yes, kind ! Very kind !"

Then, as though a blind rage seized him, he gripped the lever convulsively, and with the impetus, the carriage leaped forward so suddenly and menacingly that a chorus of surprised exclamations rose from the occupants.

"Yoi! Yoi!" said the clergyman, rising and clinging to the back, "Are you going to upset us?"

But the fine fellow vouchsafed no apology, only lessening the speed, and glancing around as though awakening from a trance.

"There is someone over there, then, who has made you suffer keenly?" I asked brusquely.

"O, yes!" he muttered between his closed teeth, "horribly!"

"Was she very pretty?"

"There was no one more so in all the country, and none more heartless either. Ah, sir, don't talk any more to me about it—or I shall become desperate and commit some folly!"

There was such a sharp menace in his tone that I did not dare continue my questioning. I looked over my shoulder at my companions. The clergyman slept and the Captain's wife had nodded till her head reclined full on his shoulder. The others were less visible to me, but I could hear them still conversing in lower tones.

Surroundings and conditions being opportune, the Captain was not slow to avail himself of the opportunity and was lavishing his choicest compliments on *la belle Anglaise*, who had created considerable havoc in the fortress of his susceptible military heart, and who was asking his advice about investing some money which was still in the doubtful region of Expectation. My inspection finished, I raised my coat collar, for the air, under the damp rock-sides that overhung our route, was chill and raw, and I also drew my soft cap well down over my forehead.

We were just passing the half-way line between the top and Glen-Ellis, where the vegetation ceases and all above the crooked evergreens, that here dare the winter blasts, is dotted with the naked skeletons of former growths, now dead and bleached, reaching reproachful, pathetic, gnarled branches, like suppliant arms, to the gray, unheeding crags that have withstood cycles of devastating elements. From here the road becomes complacent and comparatively easy of descent to vehicles, and the scent of ripe blackberries and raspberries that fringe the sides hangs heavy in the dew-laden air.

Now it was this uncanny chauffeur who first spoke, without waiting for me to interrogate him—and in what despairing tones!

"Ah, the heartless flirt!" he said. "The she-devil! For her sake, much as I love my mother and father, I would have murdered them both. She has glorious black eyes that a man might well sell his soul for, and lips which set the heart aflame! Do I not know?—for I have kissed her—Yes! And, one evening, when the moonlight softened her daring beauty, in a willow grove, near the ruins of an old castle, she betrothed herself to me. The night was more beautiful and starry than this. I thought her mine; mine forever. And, as she left me, wafting a kiss from her finger-tips, she called: 'Till to-morrow—till to-morrow.' And, when the morrow came it was as though she had never known me! She laughed in my face when I reminded her of her promise. Ah! I would rather she had bitten me to the heart with those white teeth. I should then have died quickly—but now——"

And so, without giving me time to say a word, he railed on, describing such tortures of love as I had never heard before from mortal tongue, till my own heart bled again with all the wounds of my past loves! And with such eloquence and despair.

Suddenly, standing upright and loosing his hold of the brake, he cried: "Better plunge to the depths of that ravine than suffer like this!"

With a frightful lurch and sharp turn the motor scaled a narrow stone parapet at the side, then, losing its impulse and balance, fell backwards with a sickening swirl, into vacuity! . . . . With an anguished shriek I awoke—to find that in turning through the gateway of the grounds the off-wheel had grazed a post—and this was all. For the latter part of the chauffeur's recital was but a phantom of my brain that had issued through the dream portals of Erebus. He preserved the same impassable, correct dignity of manner as usual, and his eyes were only tinged with their ever-present, inscrutable sadness as we alighted and passed into the circle of light which streamed from the hotel.

But then, I thought, it *might* have happened—and I shuddered with the recollection, the nightmare still chilling my blood.

Long Island Endurance Test

(Notes of a Timekeeper)

THE endurance test held Saturday, April 20, under the auspices of the Long Island Automobile Club, was indeed a thorough endurance test, not only for the machines, but also for those who rode in them. The weather was just ideal for the purpose of demonstrating the ability of the modern automobile to travel over heavy roads, up hill and down dale. The general performance of the machines entered was extremely creditable, and will do much to convince a sceptical public that at least there are some automobiles which can be relied upon to reach a given point without the necessity of stopping for any reason whatever. For several days previous to the event it had rained, and there were none of the participants who did not feel that they were in for a moist time. The cars were started out at thirty second intervals, the first one getting away at 9:12, just twelve minutes after the appointed time.

C. J. Field on the Oyster Bay-Massapequa Road

That considerable interest was taken in the event was attested to by the large gatherings of people, not only at the starting point, but

in the various towns through which the carriages passed en route. The course was excellently marked out, a right turn being indicated by a red flag and the letter R, while a left turn was designated by a white flag and the letter L. The route was divided into fifteen sections or time controls, at each of which the official timekeeper in each carriage was expected to note at what time they were passed. The club also had officials stationed at various points who kept track of the machines as they passed.

The first part of the contest was run in dry but cloudy weather; but for about seventy miles the riders had to contend against a blinding rainstorm, making it exceedingly difficult to pilot the machines as the mud was made to fly which, coupled with the wind, made it next to impossible to operate to any degree of nicety. The participants, however, never made any complaints, and showed themselves game throughout.

Altogether fourteen machines left Jamaica. Of these ten managed to cover the entire course; a most convincing proof of the ability of the modern motor vehicle to "get there." There were a number of carriages which accompanied the contestants for a part of the distance. These, however, for some reason, did not consider it wise to continue after the rain commenced and very quietly retired from the course. The conduct of the test, from beginning to end, reflects great credit upon those who made the arrangements. Below is given a table showing the performances of the different machines.

No. of Vehicle	Make of Vehicle	H. P.	Time	Efficiency	Award
22	"Gasmobile," . . .	9	6:58	100 %	Blue Ribbon
12	Haynes-Apperson, . .	8	7:12	100 %	Blue Ribbon
6	De Dion-Bouton, . . .	5	6:58	98 %	Red Ribbon
14	Darracq, ...	6½	7.06	98 %	Red Ribbon
2	Holyoke Automobile Co.	9	6:41	99 %	Red Ribbon
20	Daimler, ...	6	10:40	96.4%	Yellow Ribbon
19	Electric Vehicle Co., .	5	7:30	91 %	Yellow Ribbon
3	Packard, ...	9	7:59½	91 %	White Ribbon
18	"Gasmobile," . . .	9	5:37	100 %	Disqualified, having exceeded speed limit.
21	"Gasmobile," . . .	9	5.53	100 %	Disqualified, having exceeded speed limit.

Every one of the above named carriages was operated by internal combustion engines. It was a gala day for the gasoline carriage.

The hill-climbing contest for vehicles below 1,000 pounds in weight was won by Mr. C. J. Field. This took place on Roslyn Hill

about 22½ miles from the start. It is half a mile long with a grade averaging about 7½ per cent. His time was 1.48. For vehicles of between 1,000 and 2,000 pounds F. A. Law, who drove the Electric Vehicle Company's gasoline carriage, was declared winner; time 3 minutes 5 seconds. C. R. Greuter in a Holyoke vehicle was pronounced winner in the class of vehicles above 2,000 pounds; time 2 minutes 10 seconds.

The performances, taken as a whole, were excellent and speak loudly for the efficiency of the carriages as well as the ability of the

Leading Lights of Automobildom, President A. R. Shattuck, A. C. A.; President L. R. Adams, L. I. A. C. and others at Jericho, L. I.

operators. In this connection it may be interesting to note that of all the drivers there was but one who could in the full meaning of that term be called an amateur. That was Dr. H. B. Baruch. Practically all the other drivers were, in a sense, experts and directly or indirectly connected with the manufacture or sale of automobiles and in some instances the very carriage they drove on this occasion. It would, perhaps, have been more desirable if a greater number of purely amateur chauffeurs had been entered. Still, the event will go down as a memorable one in the history of American automobilism.

A Few Facts About Air Cooled Motors

By C. G. WRIDGWAY

SO many bicycle manufacturers are now turning their attention to motor cycle and motor vehicle construction that a few practical hints as to the possibilities of the air-cooled gasoline motor would not be out of place and might be of some beneficial use to a few of the less experienced.

The question of a practical form of motor for a motor cycle has been at least thrashed out by one company, the De Dion-Bouton Motorette Company, who have at the present time something like 25,000 of these small motors in successful operation. Unfortunately, however, there are manufacturers of motor vehicles both on the other side of the Atlantic and in the United States who have a tendency to abuse these small motors. When I say abuse I refer especially to the practice of putting the motors upon vehicles which they were never intended to drive, and thereby obtaining but poor results—and as a natural consequence the motor is blamed. There ought to be some caution in this respect. Every motor put upon a carriage should as far as possible be selected with a view to its fitness for the weight of carriage and the service for which it is intended.

The best results from an air-cooled motor are when the said motor is geared direct to the vehicle which it is intended to propel. In this way there is less danger of getting the motor overheated, as it is impossible for the motor to run without at the same time propelling the vehicle, and thus the engine gets the benefit resulting from the current of air which is created by the carriage while in motion.

Any vehicle or cycle with the motor fitted as described cannot, of course, have but one gear, and it is necessary to have a starting device in the way of a chain, sprockets and pedals ; therefore it is necessary to pedal until at such time as the motor has gained sufficient speed to propel the vehicle without any outside assistance. This necessitates the fitting of a coasting device so that the rider's feet can remain stationary on the pedals when vehicle is moving. This is far and away the most practical starter for this particular class of vehicle.

The smallest motor made and sold by the De Dion Company is of 1¾ horse-power air-cooled, and owing to its extreme lightness—it weighs only 45 pounds—it can be applied to both bicycle and tricycle,

and fitted with a moderate gear of say 8 to 1. It has ample power to mount any reasonable hill, in fact, I had one of the first 1¾ horse-power quadricycles ever turned out by the De Dion Company, and my wife and I traveled over the greater part of England and France upon it. I had no difficulty in mounting the hills encountered *en route;* now and again when we came across a hill a little steeper than usual I had to give a little assistance to the motor by pedaling. That was close upon three years ago.

Since that time the same company has built and placed on the market air-cooled motors up to 3.5 horse-power. At the same time, the larger the engine the more attention it requires. Even 3.5 horse-power motors are by no means the limit for an air-cooled motor. Single-cylinder motors up to 8 horse-power are now being made. Motors of this size, however, would not last long in the hands of ordinary users. The De Dion-Bouton Company has one of these—the identical machine which won the Paris-Toulouse race, a distance of 834 miles.

These high-powered air-cooled motors are intended for fast work only and I do not recommend anything over 2¾ horse-power to manufacturers who intend making tricycles, quadricyles or light vehicles for the American market, as it is impossible with the poor condition of American roads to maintain the necessary speed and thus to create a current of air with which the engine is cooled for any larger size.

To those who anticipate making tricycles with a quad attachment, I recommend the use of a 2¼ horse-power motor for ordinary use and fitted with an 8 to 1 gear. That is to say, that the engine makes eight revolutions to the one of the driving wheels. So fitted, a speed of eighteen to twenty miles per hour can easily be obtained, while for speed work a 2¾ with a 5 to 1 gear would be found ample.

The question is often raised as to the sociability of the quad for two persons, and not a few manufacturers are now looking towards the construction of a light, single-seated vehicle for two passengers side by side. To meet this class of trade, the De Dion-Bouton Company has a combination of air-cooled cylinder and water-jacketed head motor of 2¾ horse-power, the water circulating in the thermo-syphon system. This motor allows of the building of a very light vehicle fitted with two speeds and a friction clutch, the high gear giving up to 23 miles per hour and the hill climbing gear up to 7.

Five Hundred Mile Endurance Test of the Automobile Club of America

BELOW are given the conditions of the first annual endurance contest of the Automobile Club of America. This will be held during the week commencing September 7, 1901.

The official route of the trial be from New York to Buffalo.

The total distance will be divided into "stages" for each day, on the basis of covering approximately eighty-five miles per day ; the division of distance to be left to the discretion of the committee in charge.

		Approximate Distance.
1st Stage :	From Club House to Poughkeepsie, . . .	90 miles
2d Stage :	From Poughkeepsie to Albany, ...	70 "
3d Stage :	From Albany to Little Falls, including a Hill Climbing Trial near Little Falls, ...	85 "
4th Stage :	Little Falls to Syracuse, ...	85 "
5th Stage :	Syracuse to Rochester, ...	90 "
6th Stage :	Rochester to Buffalo, ...	80 "
	Total, ...	500 miles

A start will be made on Monday morning from the club house, and to finish at Buffalo on Saturday afternoon of the same week.

The contest will be opened to all classes of self-propelled vehicles, but no manufacturer, agent or private owner will be allowed to enter more than three vehicles in any one class.

CLASSIFICATION AND DIVISION.

Vehicles shall be divided into five classes or divisions, and all four-wheeled vehicles shall carry two or more persons. Following are the classes :

Under 1,000 pound class : Four-wheeled motor vehicles weighing under 1,000 pounds, in commercial running and operating condition, with all tools, fuel and supplies on board.

One thousand to 2,000 pound class : Four-wheeled motor vehicles weighing between 1,000 and less than 2,000 pounds, in commercial running and operating condition, with all tools, fuel and supplies on board.

Two thousand pound or over class : Four-wheeled motor vehicles

weighing 2,000 pounds or over in commercial running and operating condition, with all tools, fuel and supplies on board.

Motor Cycle class: Motor bicycles, motor tricycles and motor quadricycles.

Public Service class: Public conveyances and freight conveyances. These shall carry a minimum weight of 750 pounds, exclusive of their driver.

The conditions of the test will be average speed for the six days, and any competitor falling below an average of eight miles per hour, for any one period, shall not receive any credit for that period.

Certificates shall be awarded by the club as follows:

A Certificate, average speed from twelve to fifteen miles per hour. B Certificate, average speed from ten to twelve miles per hour. C Certificate, average speed from six to ten miles per hour. No average speed in excess of fifteen miles per hour shall be recognized. Public service vehicles shall receive a certificate stating their average speed, which must not be less than eight miles per hour, and the weight carried shall also be stated in the certificate. All vehicles, whether electric, steam or gasoline, or otherwise, shall operate in the same class, divided only as designated by weight.

Controls are to be officially established at the start of each day's run, at the lunching places and at the finishing places of each day's run. The start is to be made each morning at 8 o'clock, and an hour and a half allowed for lunch. Controls are also to be established on the Hill Climbing Trial near Little Falls, which trial will be a separate matter.

The test is to be under the charge of a committee to be designated by the club, and they to have entire charge of the details and control of the run from time of start to finish, and shall render their report to a board of judges, of not less than three, who shall make the awards and decisions, such judges to be appointed by the Board of Governors, and to be entirely disinterested from any manufacturer or allied interests in the automobile line.

The entrance fee for all classes, motor cycles excepted, shall be $50 for each vehicle. In the motor cycle class the entrance fee shall be $25 for each vehicle.

An official catalog is to be issued by the committee giving detailed information of the trial, such as rules and regulations governing the trial, names, addresses and tariffs of the hotels where stops will be made, places where vehicles will be stored over night, gasoline agents,

and map of the entire route of the trial; also such other information as may be advisable and necessary. Advertisements will be allowed in this catalog, under the direction of the committee in charge of the run, and no manufacturer to be allowed to take or purchase more than one page for advertising purposes in such catalog. Suitable direction posts will be erected along the entire route of the trial, similar to those that are proposed to be erected between New York, Boston, Albany and Philadelphia; these posts to be permanent, and to be erected under the supervision of the Automobile Club of America, in co-operation with other clubs, along the route of the trial.

That the friendly co-operation and assistance of the police and village, town, city and county road commissioners along the route of the trial is to be secured as far as practical and possible.

Each competing vehicle must have securely attached to it, in a conspicuous position, an official number corresponding with the said number in the catalog, and that no other marks or signs other than the manufacturer's usual name or number plate as fixed to a vehicle, as sold to a customer, be allowed during the period of the trial. That the Trial Committee officially issue, from time to time to the technical press, such information regarding the trial as may in their opinion be considered advisable. The penalty for a vehicle being towed in any period, shall be disqualification for that period.

The De Dion-Bouton Motorette Company announce that soon they will place on the market a De Dion motor of 8 horse-power. This will be offered to the American trade exclusively. The tendency abroad as well as here, is toward increased power. This new carriage will embody all the latest French ideas, will have tonneau body, wooden wheels (when desired) and wheel steering. This company is very busy at present filling orders for their well-known "New York" and "Brooklyn" types of carriages.

Chains for Motor Carriages

MUCH has been said for and against the use of chain drives on automobiles. There are those who consider that if freedom from anxiety is desired the chain should be abandoned altogether. While this may be true, as some continue to assert, that the use of chains is not mechanically correct, there are others who think that in the absence of anything like a satisfactory chainless drive a chain answers the purpose better than anything else. In this connection it gives us pleasure to reprint an article contributed by R. W. Buttemer to the *Motor Car Journal* of April 13, in which he makes reference to some of the principles involved in the designing of chains for motor cars.

"There are few cars into whose anatomy chains do not enter somewhat, but there are fewer still in which such chains are run under satisfactory conditions for efficiency and durability. To this may be attributed the occasional attempts to break away from the chain tradition and supply their place by bevel gear, shafts, and other substitutes, which can never exceed, even if they equal, the efficiency of a perfect chain. What other form of gearing would stand the conditions of a driving-chain, exposed to road grit in dry weather, covered with mud in wet, and expected to exist on a small amount of lubricant that a more or less regular but superficial application of oil or grease can supply, supplemented in more careful hands by an infrequent soaking in melted tallow? If gear-cases had not been introduced on cycles, there is little doubt that some chainless gear would have become almost universal, not on account of any mechanical superiority, but because it was protected from dirt; and a similar cause acts in the same way with regard to cars. There is no reason, however, why such a silent, efficient and convenient transmission as is afforded by chains should not be used to an even greater extent if properly protected, and, in fact, several cars have now appeared in which the whole gearing consists of them.

"The most casual survey of modern automobiles shows a perfectly astonishing diversity of practice with regard to the proportions of driving chains, and a few remarks on the principles involved may not be out of place in this connection. In the first place, the form of chain has to be considered, and though there is little to choose in efficiency between different forms when lubricated, the roller chain is probably

preferable where, as is usually the case, lubrication is insufficient, both as causing less wear on the teeth and as having, in the same size, more ample dimensions of wearing surfaces, though the lower price of the block chain may have compensating advantages. The Renold laminated chain, though theoretically good, is hardly satisfactory under road conditions, needing to be kept tight, and offering much lodgment to grit, and it is little used for this purpose.

"As to the size to be employed, in which such widely different practice is evident, there is little necessity for fixing this on theoretical

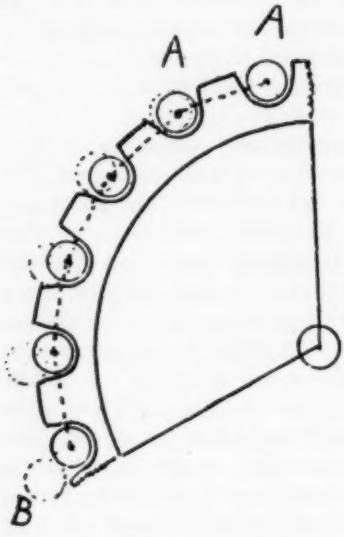


FIG. 1.

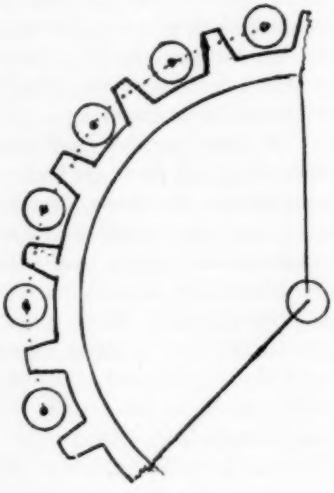


FIG. 2.

grounds of power to be transmitted, where exposed chains are in question. A chain becomes useless when so stretched as to cease to run smoothly, and to show a tendency to jump the teeth, and as this stretch is almost entirely due to wear on the rivets, the only way to diminish it is to have them excessively large and long as far as mere power-transmission is concerned. For this reason a large chain is preferable, as having a much longer life, while thickness in the side-plates is needed, not for tensional strength, but to provide a firm attachment for the sleeves in which the rivets work.

"Another point about chain gearing is that a chain can never be

in true pitch with its sprocket. A pair of spur gears tend—to a certain extent—to wear into a good running fit with each other, but a chain, if made to fit its sprocket when new, does not continue to do so a moment after being made, as wear at once throws it out. This being so, it must be put up with, and involves the consequence that a chain can only drive with one tooth at a time, supplemented by any frictional "bite" the other links may have on the base of the tooth interspaces. If the chain be made to fit these accurately, as in Fig. 1 (taking a roller chain in illustration), it is obvious that the least stretch will cause the rollers AA to begin to ride on the teeth as at BB. If, however, the teeth be made narrow compared with the spaces between the rollers, a considerable stretch may occur without this taking place. The roller interspaces, then, should be long, to permit the teeth to have some play in them, while retaining sufficient strength, as shown in Fig. 2.

"In order that the driving sprocket may receive each incoming link of the chain without its having to slide up the tooth-face, it should be of a somewhat longer pitch than its chain, the result being that the bottom tooth takes the drive, this being permitted by the tooth-play shown in Fig. 2. This difference, of course, gradually disappears as the chain stretches. The back wheel sprocket, on the other hand, should take the drive with its topmost tooth, and hence should be of slightly less pitch than the chain, but as the pitch of the latter constantly increases, it may be originally of the same pitch. The only remaining point with regard to design, and one which the owner of a car may easily ensure, is that the number of teeth in the sprockets should be prime to that of the links in the chain, or at least that the latter should not be divisible by the former, so that each tooth in turn of the sprocket shall engage every link in the chain, thus ensuring equal wear.

"As the presence of mud and grit is usually inevitable, the lubrication of the chain is best effected with as heavy a lubricant as possible, and the conveyance of this to the rivets is only to be ensured by taking the chain off and immersing it in melted grease, tallow (well freed from salt) with a modicum of graphite being as good as anything. The application of chain greases to it *in situ* lubricates the rollers and teeth, but little of the lubricant so applied ever reaches the rivets, and if oil is used, though it may penetrate to them, it is soon removed from the surface by the accumulation of road dust. Shedding of chains is generally brought about either by excessive looseness or want of alignment between the sprockets and back chain wheels; a sufficient trans-

verse rounding of the tips of the teeth is advisable to diminish the chance of it. A shrouding or flange each side of the teeth for the side plates of chain to bear on is certainly desirable, as diminishing the wear on the rollers and giving a certain increase of frictional drive; but it is not always provided. It may be here noted, as the reply to a question occasionally asked by untechnical drivers, that where there is a differential on the countershaft an inequality in the tightness of the chains does not affect their each taking their share of driving; and it is more important that the parallelism of countershaft and back axles shall be maintained than that the chains should be kept equally tight at the sacrifice of this."

We have received from the Olds Motor Works, Detroit, Mich., catalog describing and illustrating their various motor vehicles. These carriages have demonstrated their efficiency. They are perfectly practical, reliable and durable machines. Having been in the gasoline engine business for a great many years this company has familiarized itself with the problem of gas engine design. These motor vehicles weigh but 580 pounds, and if so desired, can be fitted with detachable dos-a-dos seat. Enough fuel can be carried to take one 150 miles over good roads. Copy of catalog will gladly be sent to any one upon application.

Below is given a table of the resistance in pounds per ton on iron tired wheels when traveling over various roads:

Asphalt,	22	to	28	pounds
Wood, hard,	22	"	26	"
" soft,	30	"	38	"
Macadam, hard and smooth,	40	"	45	"
" good,	45	"	52	"
" wet,	52	"	58	"
Gravel,	100	"	140	"

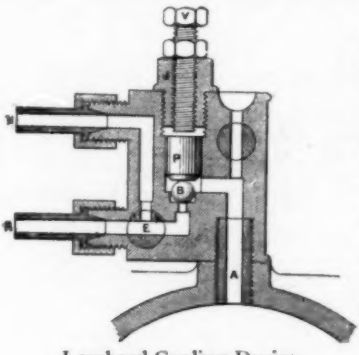
In a great many instances these resistances increase as higher speeds are reached.

Cooling of Gasoline Motors*

THE following arrangement for cooling cylinders of internal combustion engines is taken from *La Nature* and will, we feel sure, be of interest :

The successive explosions which are produced in the interior of petroleum motors, while operating, cause a heating of the sides of the motor, and especially of the compression chamber, a fact which has an influence on the production.

The two methods previously employed to effect this cooling, consist : 1. In providing the exterior of the motor with wing flanges, thus increasing their surface for cooling by contact with the surrounding air ; 2. In surrounding the cylinder and the compression chamber with a casing in which water is circulated.



Lombard Cooling Device.

The first means is only applied to motors of feeble power, two and a half horse-power at the maximum. The other is designed for powerful motors. For some motors having an intermediate power, two and a half to three horse-power, these two systems are combined by furnishing the cylinder with air flaps, and the compression chamber with a water jacket.

Another process, contrived by M. Lombard, consists in ejecting into the interior of the cylinder itself a small quantity of water ; the heat necessary for vaporizing the water causes a partial cooling of the motor. The apparatus is thus constituted : A small quantity of water coming from a tank is introduced through the conduit "R" at each suction stroke into the compression chamber "A" of the motor, passing through a three-way cock "E." A ball "B" placed in the passage regulates the quantity of water introduced. The raising of the ball is limited by a screw "P J V." This is adjusted once for all according to the motor. By means of the three-way cock, the flow of water can be stopped and turned back by "H" into the tank.

This apparatus, which we have seen in operation on an air-cooled motor, seems calculated to give good results.

* Translated for the AUTOMOBILE MAGAZINE.

Among the Clubs

(*Secretaries of clubs and chairmen of committees are requested to send in items of news for use in this department.*)

Chicago—The initial run of the Chicago Automobile Club was held on Saturday, April 13. The vehicles formed in front of the club rooms in Steinway Hall, and promptly at 2 o'clock started on the run. The following automobilists were among those who took part: Emmett O'Connell, W. E. Parsons, Miss Nellie Rankin, Mrs. N. M. Burns, T. C. Hughitt, W. M. Vance, T. C. Doolittle, F. W. Roundwith, F. C. Donald, J. Dreyer, J. M. Hall, H. E. Miley, Mr. and Mrs. W. D. Sargent and S. A. Miles.

Paterson, N. J.—At the annual meeting of the North Jersey Automobile Club, held Saturday, April 13, the following officers were elected for the year: President, Chas. D. Cooke; First Vice-President, Vernon Royle; Second Vice-President, J. E. Barbour; Secretary and Treasurer, Edward T. Bell, Jr.; Captain, William H. Fletcher.

Cincinnati, O.—The following information regarding the Automobile Club of Cincinnati has been gathered from a letter just received from Dr. L. S. Colter of that city, who is one of the Board of Governors:

Concerning the newly formed Automobile Club of Cincinnati, would say that early in March several owners of automobiles in Cincinnati sent out communications to all owners of automobiles in the city asking them to meet at the Business Men's Club on a certain date to discuss the advisability of forming an automobile club. In response to the invitation, twelve owners of automobiles met and organized a club. At the next meeting, a week later, a constitution was adopted and a board of five governors elected. The membership of the club will be limited to active and associate members. The active members are those who own automobiles, and the associate members those interested in automobiling, but not owners of machines. A membership of twenty is expected to start with, and it is hoped to increase it in a short time to fifty. Several automobiles have been purchased by Cincinnatians since the club was organized, and a number are contemplating buying this summer, and from these it is expected to increase the membership. Mr. R. A. Holden was elected President; Howard

Rodgers, Vice-President; T. C. Meadows, Treasurer; and R. H. Cox, Secretary. The Board of Governors consists of R. A. Holden, Howard Rodgers, T. C. Meadows, Col. Max Fleischman and Dr. L. S. Colter.

New York, N. Y.—Nearly two hundred patrons of the automobile attended the annual dinner of the Automobile Club of America, held April 18, at the Astor gallery of the Waldorf-Astoria. Lieut. Gen. Nelson A. Miles was the guest of honor, and the theme of the evening was "Good Roads." It was interesting alike to horsemen and automobilists, and all applauded the statement by State Engineer Edward A. Bond that a bill was proposed for action by the Legislature to issue bonds for the amount of $5,000,000 to be devoted to good roads. General Miles was the first speaker, and he was greeted with generous applause. He spoke of good roads from the National standpoint. President Albert R. Shattuck, in referring to the New York good road appropriation this year, secured by dint of hard work said that he was recently in Dallas County, Tex., and the citizens were discussing the advisability of bonding the county for half a million dollars to be expended on better roads. Other speakers were Congressman J. S. Sherman, of Utica, who spoke on the Pan-American Exposition; Gen. Roy Stone, on "Federal Paving"; M. H. De Young, "The Press and the Automobiles," and M. J. de Verdery, on "Ideal Automobilism."

There was a joint run of the Automobile Club of America and the New Jersey Automobile Club, Saturday, May 11th. The New York contingent met the New Jersey automobilists at Belleville, N. J. A start was made from that place at 12.30. It seems that some of the New York crowd hit up a pace which the staid fathers of some of New Jersey's towns considered just a little too fast. The result was a fine-paying act at Morristown. Word was sent ahead of the advance of record-breaking chauffeurs and when Morristown was reached policemen were on deck ready to arrest. Still, the run was satisfactory. The time will soon come when automobiles will be able to go out on runs without being hampered by the ghost of a policeman demanding them to hold up their hands. The day was a fairly good one, although the roads, owing to previous rains. were muddy.

May 3 the Automobile Club of America commenced putting up signposts along various roads in the East. These posts will first be placed on the roads between New York and Bridgeport, and New York and Albany. At the Capitol City the Automobile Club of Buffalo will take charge of the signposts and place them from there to Buffalo. The posts are ten feet in height, made of Bessemer steel, and are to be painted black with aluminum letters on the four arms, with arrows indicating the way. They are to be placed at all important crossings and branches. There will be twenty of these guides between Bridgeport and New York. Between Albany and New York there will be thirty. Forty will be erected in various portions of Long Island. A fund for the purpose has been set aside by the Associated Automobile Clubs of America, which consists of the Bridgeport Automobile Club of Bridgeport, Conn.: the Automobile Club of Philadelphia, the Long Island Automobile Club, Automobile Club of Buffalo, and the Automobile Club of America of New York City.

The South Carolina Interstate and West Indian Exposition, to which reference was made in our last issue, promises to be quite an important event. An automobile speedway is to be one of the attractions. Efforts are being made to have this speedway laid out as a good roads exhibit. This strikes us as an excellent idea, and we shall hope that when carried out much good may result from it. In a recent letter regarding this subject, Mr. E. L. Tessier, Jr., who has this matter in hand, says:

"As one of the Vice-Presidents of the National Good Roads Association, I attended a meeting held last November, in Chicago, and was much encouraged by what I heard and saw at the meeting, and I trust the South will look up to the necessity of improving our roads, and also realize the economy of using horseless carriages, to say nothing of the sanitary aspect of the matter."

Mr. W. S. Rogers, until recently manager of the Ball Bearing Company, of Boston, has associated himself with the Steamobile Company of America, at Keene, N. H., as Vice-President and Manager of the manufacturing department; Mr. Rogers' severance from the Ball Bearing Company being due to the fact that the plant has been sold.

Operation of Electric Carriages

By H. M. UNDERWOOD

ONE of the essential points in the proper operation and maintenance of electric automobiles depends largely on the good judgment on the part of the owner or the person to whose care the vehicle is intrusted.

When purchasing a carriage, whether it be a runabout, break or Stanhope, etc., one is carefully instructed in the proper care and working of the vehicle by the representatives of the company from whom he made his purchase. He is instructed as to the charging of the batteries, and is told that he should begin to charge at about twenty amperes, and gradually reduce the rate of charging, from time to time, until they are well filled, taking care while charging to leave the door of that part of the vehicle where the batteries are located opened, so that the slight gases which are generated while being charged can escape. He is also shown how to have the controller in order, that all the cells are connected into the circuit when charging, and after going into several minor details, he has the pleasure of trying, possibly for the first time, the running of the automobile on the street.

Great care must be taken that the current is not on the motors while the brakes are set, for it would, if left so for any length of time, heat the motors and tend to break down the insulation of same, as well as rapidly emptying the batteries of the current contained therein.

Now the purchaser has questions to ask. As a general thing the first is how many miles can you run on one charge of the batteries? Well, the general answer is, from twenty to thirty-five miles, according to the make of vehicle and the way in which it is handled, but this mileage is generally based on a level roadway. Next comes the question how steep a grade can you climb, and do you save anything when you are going down grade, and how fast can you make it go, and if you run your batteries down so that they are entirely empty, will it do them harm? How long will it take in case you do to get them charged? When in this case you tell him from two and a half to three and a half hours, he throws up his hands and declares he cannot wait as long as that. What reply can be made to such vital questions? The best answer that can be given is do as you are told, and all will go well; but it is human nature to deviate more or less from the rules of

any subject, so to be on the safe side, follow out at all times and in every detail, the rules and teachings of those who have had years of practical experience and training, and who should know, if they do not, how to operate the machine with which they are so familiar.

Why is it that automobiles cannot run without repairs longer than they do? In answer to such a vital question, I am able to state that if a little more judgment were used, just as in the case of driving or caring for a horse under like conditions, the many troubles and heavy bills for repairs would not have been heard of.

What do some people expect of an automobile? Do they think it is going to travel at the rate of sixty miles per hour? Do they expect it to go up grades which are so steep that they would never think of driving a horse up, not even a team with a light buggy, or to make the same time on a grade that you can on a level, hard roadway? I am very sorry to say that it comes very close to being this way with many persons owning a vehicle at the present time.

There are some people who seem to think because the carriage is without a horse that it can go anywhere, and at any time, and remain out indefinitely without recharging. This, certainly, is not just the fair thing. The simple fact that you have charged the batteries full does not follow that this is all that is required or necessary to enable the vehicle to run twenty-five, thirty or forty miles on a single charge. Some people expect, and look for it, and are often disappointed.

Naturally enough the question will be asked as to the best test in knowing when your carriage is reaching the limit of mileage. There are some motors that take more current than others, and some makes of batteries that will drop much faster than others towards the end of their capacity in output, but as a general thing the conditions are the same. I have operated one particular make of electric automobile that gave a good example of knowing the conditions as set forth in the above question.

In starting out the carriage in question, which was a break weighing 2,460 pounds, with 96 volts recorded on the volt meter, had during the day made a run of about thirty-eight miles on one charge, and at the end of this time the volt meter registered 64 volts. Now the break would run at about one mile per hour when the first speed was thrown in, and according to the experience with this equipment, showed that when the third speed was thrown in the mileage would be about three miles per hour, same as it would be when the batteries were fully charged and running under its first speed.

This showed me that I could run about one and a half to two miles further on the third speed before I became fully started, but as a precaution I ran a few blocks, then stopped for a few minutes and let my battery pick up a little, but as a general thing it is better to keep right on, as the starting of the carriage makes a heavier draft on the batteries than at any other time. I had about one and a quarter miles to go before I reached the repository where I could get a charge, and while it was a pretty close call, still I reached there before I had entirely emptied my battery. You must keep in mind that this is not a good thing to do, as it will shorten the life of your batteries, but when you get in a tight place like this, you have got to make the best of it.

Now, why does this state of things abound? Why is it that a large percentage of operators and private owners find this very trouble regarding short mileage time and time again? Let us stop for a moment to consider what this means, and, if possible, obviate this great annoyance of delays and breakdowns.

Consider, for example, that you start out for a run. You glide over the fine hard roads which are to be found in many of our cities. You take quite a little hill, at full speed you reach the top, and in another second on the way down the other side. Now, what do a good many of us do in this case, or rather what should you do when descending any grade? Any intelligent person will tell you to shut off your power and save your fuel as much as possible. But many operators do not seem to observe this simple rule.

There is another important matter which is quite common with many, and that is forgetting to release your brake before applying your power, which simply illustrates another cause for reduced mileage. One ought always to start with ease, cutting in one speed at a time and gradually work up to the maximum the same way a careful driver would his horse, or the competent engineer his train.

Let us now take up the subject of the batteries and find out what constitutes good care and attention in this most important part of the electric automobile. The batteries are what you might term the heart and blood of the vehicle. In the operating of your machine, do not try to go twenty-five miles, when by your volt and ampere meter you can readily see you have only twenty-two or twenty-three miles left, for if you do, trouble is in store for you. Do not overwork your batteries. Often is it the case that an owner makes a twenty-five or thirty mile run, and upon his return, runs the vehicle into its barn and thinks

no more about the carriage until ready to go out again. What is the result? You find that the batteries are about run down, you begin to find fault with existing conditions.

The simple fact that you have a machine that is made of wood, iron and batteries is all that you think of. You wonder why the batteries have got into such bad condition, and why better ones were not made. What is the real trouble now? Why, it is a very simple answer; they are simply hungry, and by not feeding them in the proper way or at the proper time, they become worn out long before they ought and rapidly lose their life, and there you are up for repairs. This state of affairs is not one which only comes to light by the greatest slip or slightest accident, but is a well established fact; and before long, new batteries have to be installed.

Now, in order to keep your batteries in good condition, do not allow them to be discharged below the safety point, which simply means the rebuilding, in part or in whole, of the plates of the batteries. In the charging of the batteries, do not feed or rush the current through the cells so fast that it causes the solution to boil; and, as I said before, charge at the rate of 20 amperes on the start, thereby packing the current into the batteries as you should.

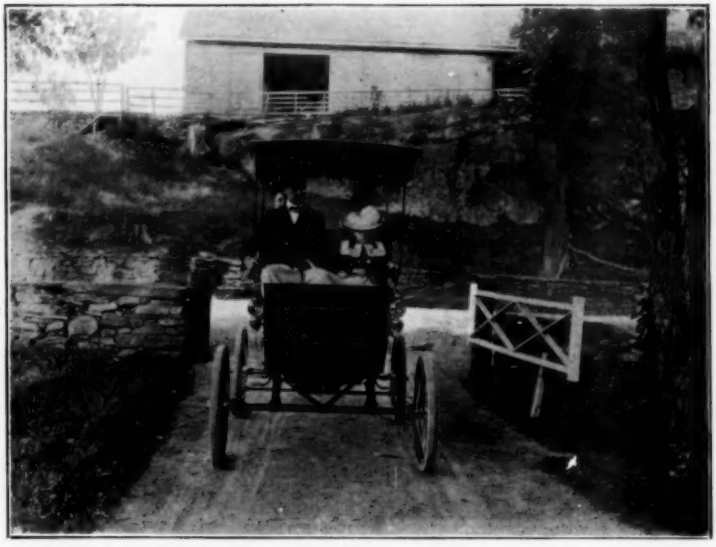
Another and no less important matter which must constantly be kept in mind, is to see that the batteries are constantly kept filled with the proper amount of solution and also of proper strength, viz., ten parts of distilled water to one part chemically pure sulphuric acid mixed at least twelve hours before you need to use same, which will give plenty of time for the solution to get perfectly cold, for the act of mixing the water and acid together creates a great deal of heat. Always mix the acid into the water and have the receptacle perfectly clean, using a large stone crock for the solution.

Whenever you find the tops of the plates in sight, it is high time that the batteries were attended to, for if neglected, the plates will burn at the exposed parts.

So you see the greatest amount of trouble comes from not following out the instructions which were first given you, and your trying to do more than the carriage was built for, shows in itself where and in whom the great faults are to be found.

The Lane Steam Automobiles

SOME time ago Lane Brothers, of Poughkeepsie, N. Y., decided to construct a motor vehicle which would be more satisfactory than the machine they were at that time using. Operations were begun and the result was the turning out of a carriage, which when operated in the streets of Poughkeepsie, created quite a favorable impression. People who saw and rode in it, and who had been contemplating the purchase of a self-propelled



Front View of Lane's Steam Surrey

vehicle, knew a good thing when they saw it—and like Oliver Twist—asked for more.

There appeared to be quite a demand for carriages similar to this first one built, and as a consequence, they commenced on one or two other types. In this connection it gives us pleasure to present illustrations of this company's surrey.

The moment one sees the product of this concern for the first time, he is impressed by the strength of the various parts. One trou-

ble with many builders of steam vehicles especially, has been the tendency to make too light carriages. Lane Brothers have guarded against this, but have not gone too far in the other direction. They are built amply strong for hard usage, and what is more, have abundant power to run them. The aim has been to get the best possible results from the mechanism, and then to make each part amply strong for its duty, aiming at durability and the greatest simplicity compatible with the desired results.

The carriages have a long wheel base and standard tread. The

Steam Surrey Built by Lane Brothers, Poughkeepsie

wheels on every carriage are of uniform diameter and are very strongly built. The hill climbing qualities of these carriages are remarkable. They have a tractive force of about thirty per cent. of their full loaded weight, including passengers. Of course, to say that a vehicle will climb a hill of any certain grade does not mean anything definite, as so much depends upon the condition of the road. These carriages are easily able to ascend any hill met with under ordinary road conditions. Enough fuel can be carried to run about seventy-five miles. The

air pressure in fuel tank is entirely automatic. The working parts are so placed as to be easy of access, a very important point.

They make ideal pleasure vehicles, and on account of their radius of action are well adapted for touring. They also make a runabout and a dos-a-dos.

Ideas of Inventors

(*Copies of patents can be obtained from Patent Office, Washington, D. C., by sending five cents in coin.*)

A new design of mixing and vaporizing device for explosive engines has just been devised by Clarence O. White, of Minneapolis. Patent No. 671,743.

George Westinghouse has recently had patents awarded on a rotary motor or pump. This comprises a cylinder with a rotary drum mounted in same, and provided with piston slides. Patent No. 672,971.

Gaston A. Brondee, of New York, has recently been awarded patents on a motor which, by means of his arrangement of gears and shaft mechanism, all clutches can be thrown out of engagement by applying the brakes. Patent No. 673,110.

Henry C. Osborn, Cleveland, Ohio, has invented an explosion engine in combination with a spring motor, together with a mechanism whereby the outward movements of the piston in turn winds up a spring motor, by the unwinding of which the main motor can be set in motion. Patent No. 673,284.

Harry A. Knox has been awarded patents on his device intended to effect the radiation of heat from cylinders of internal combustion engines. This consists essentially of drilling holes in the cylinders, tapping these and screwing therein pins, which it is claimed act as heat conductors. Patent No. 671,768.

A new transmitting and steering mechanism for motor vehicles has just been invented by Alfred Riegel, of Paris. The invention, while it does away with the use of a differential gear, enables motion to be transmitted to the two front wheels by means of a single motor. This is accomplished by throwing out or in one or both switches. When both are in it gives a rigid axle. Patent No. 669,663.

Henry Wilcke, of Detroit, Mich., has just been awarded patents on a starting mechanism for automobiles. The invention consists of a device attached to under part of vehicle and by means of which the vehicle is lifted to a sufficient extent to cause the running gear to be wholly or partially relieved at the moment of starting, the time at which the expenditure of power is greatest. Patent No. 670,189.

Edward T. Birdsall, of New Rochelle, N. Y., has been awarded patents on a new form of steam boiler for use on motor vehicles. This is of the vertical type, and has a central main fire tube with other and smaller fire tubes placed around it. All tubes are connected with one draft chamber. Fuel is supplied at the top. Patent No. 671,937.

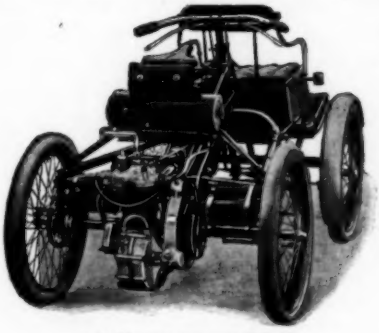
This same gentleman has just designed a new form of heat-radiating pipe.

John Eckhard, of Brighton, N. Y., has just invented a gas engine which possesses some new features. The arrangement of the valves is extremely compact. The inlet and exhaust ports are controlled by the piston and a gas reservoir. A passage leads to the inlet port from this reservoir. In this passage are a series of restricted partitions for preventing the passage of flame back to the reservoir. Patent No. 673,427.

Cooling means for gas engines are quite numerous. That just invented and patented by John W. Raymond, of Oil City, Pa., is the latest of such devices which has been called to our attention. This consists of two cylinders arranged, one behind the other, their inner ends connected by a single stuffing box. A hollow piston is carried in these cylinders with a hollow piston rod connecting them with a water inlet and outlet. Patent No. 673,029.

De Dion Quadricycle

THE accompanying illustration is of the 1901 model De Dion Quadricycle. This vehicle carries a 2¾ horse-power water-cooled motor. It also carries a clutch mechanism which is exceedingly simple. In starting, it is only necessary to use the pedals, while the quadricycle is put in motion by engaging the friction clutch, just as in the case of the motorettes built by the same company. Beneath the water tank and behind the saddle is placed a radiating coil by means of which the water cooling is effected. These machines are equipped with the latest De Dion type of vaporizers which has given full satisfaction. The frames of these wheels are substantially constructed and sufficient fuel can be carried to enable them to cover long distances.



2¾ Horse-power Quad.

Notes From Abroad

The automobile is put to a curious use at Auteuil. When a horse has been injured in the steeplechases, if it is unable to rise, a specially constructed motor car is brought up, and the wounded animal deposited in it and transported thereby to the care of the veterinary surgeons. The new vehicles, replacing the heavy and antique vans formerly in use, are an innovation of M. de La Haye-Jousselin, the new president of the Society of Steeplechases, of France.

There is a great deal of discussion going on just now over in England regarding the operation of automobiles on the highways. In order to demonstrate to members of district councils the safety attending the use of automobiles thereon, private owners were recently delegated

to take councillors out for a ride in their carriages. This is the best method of convincing objecting councillors of the safety of the automobile, and is well worthy of imitation in other quarters of the globe where objection to automobiles is made.

According to a consular report just received from Frankfort, Germany, a Berlin engineer has constructed a trolley automobile line similar to that exhibited at the Paris Exposition, at Eberswalde, a small city near the German capital. In this system the automobile simply receives its power from an overhead wire by means of a trolley, which is connected with the automobile by means of a movable cable. This arrangement permits the vehicle to turn out at any place on the road when necessary. The consular report adds that this system is expected to meet with great favor in Germany.

April 13 a fuel consumption contest was held under the auspices of the Automobile Club of Great Britain and Ireland. Seven competitors took part. The distance covered was thirty miles and over heavy roads. The following table shows the result :

Vehicle.	Passengers.	Horse-Power.	Weight Without Passengers. Lbs.	Consumption. Gallons.
No. 1	4	10½	2,300	1.70
No. 2	3	7	700	1.00
No. 3	3	6	600	.99
No. 4	4	6	1,900	1.34
No. 5	4	6½	1,900	1.19
No. 6	4	7.2	1,900	1.34
No. 7	3	4½	800	1.14

The *Auto-Velo*, of Paris, is organizing a challenge cup race for voiturettes for the benefit of manufacturers. It will be held a little before the Paris-Bordeaux race in June, and each competitor will be required to run three vehicles of the same make. The following are the rules :—(1) The race shall be held annually over a distance of 200 kilometers ; (2) Every competitor must run three vehicles ; (3) Classification will be determined by adding together the time taken by the three vehicles entered in completing the course ; (4) Eight hours is allowed to complete the distance, and any time over that period will be reckoned as twelve hours ; (5) The cup shall go to the competitor whose three vehicles shall have completed the course in the shortest time ; (6) The entrance fee is 20 francs for each vehicle ; (7) Each

vehicle must contain seating accommodation for two passengers side by side, be without pedals, and weigh not more than 13 cwt.

Michelin, of tire fame, recently contributed to *Auto-Velo* some points regarding the best way of preserving rubber. He said, "Light and change of temperature seem to be its two great enemies. Bright light acts chemically on rubber and hardens it, taking away all its elasticity. Sometimes, when outer covers have been left for a long time in a show-room, they become hard and brittle like wood. It is the blue and violet rays of the solar spectrum which attack the rubber, the red rays having no action on it. Variations of temperature are the cause of an infinity of little slits, which day by day grow bigger and bigger until they render the objects useless. Rubber must, therefore, be kept in a dark place, in an even temperature. Moisture should be avoided, as it rots the canvas of the covers, though it has no effect on the rubber. A dark room in the house is the best place to keep your spare tires, the covers of which should be left wrapped up in the packing canvas. The inner tubes should be placed flat on the ground to avoid folds. All these precautions apply to new tires, those that have been already in use some days get less sensible to light and change of temperature. On coming in from a run the mud should always be wiped off the outer cover."

One would naturally expect that owing to the increase in mechanical transportation during the past few years the number of horses would have decreased correspondingly. That such is not the case, however, is shown by E. Lavalard, who is manager of the General Omnibus Company of Paris. It is estimated that in 1840 in France, just about the time when steam railroads were introduced, there were about 43,000 horses engaged in overland transportation. Practically, all of these were replaced by the locomotive, and yet figures show that the demand for horses in other industries more than made up for the substitution. After giving figures, in which he shows the increase in the use of horses in various countries, M. Lavalard discusses the probable effect of bicycles, automobiles, electric railways and other horseless vehicles of the present time on the future of horse production. He does not think these will seriously affect the industry of horse raising, although he admits that the type of horse will improve in quality under the new conditions.

The committee of the Union Automobile Club of France has just issued its report upon the trials of non-slipping tires recently held on the old bicycle track at Courbevoie, which was partly covered with frozen snow, and partly treated with an application of soft soap—not, of course, in the usual sense of the term. The competitors had to suddenly apply the brakes when traveling at varying speeds, from ten to twenty kilometers an hour on the flat, and on the banks, and also start the vehicles up the raised corners of the track. The cars were then taken to a macadam gradient to see the effect of the tires on the surface of the road when the brakes were applied, and similar tests were carried out on a greasy granite paved road, raised in the middle, and with the brakes applied only on one side. There were four competitors, MM. Chameroy, the Compagnie des Pneumatiques et Bandes a Courroie Ferrée, Lucas, and Menier. The report states that the tire presented by M. Chameroy is of the solid rubber type, covered with steel segments, which alone come into contact with the road. The slipping was only three millimeters on the cement, and three centimeters on the snow, while the tire had no perceptible effect on the macadam, and the tests upon the granite setts were satisfactory. The tire seems capable of a long life, and is especially suited for heavy cars, as its elasticity is, of course, greatly inferior to the pneumatic tire. It makes a good deal of noise when running.

The United States Long Distance Automobile

IT was our privilege recently to take a spin in the first carriage built by the United States Long Distance Automobile Company, and we were delighted with the ease with which it ran. The vehicle is of the runabout type, capable of seating two passengers.

The engine used is of the single-cylinder horizontal type, water-cooled. We were especially pleased with the absence of noise and vibration while in motion. She glided along with very little fuss indeed, and those features of this latest addition to the list of gasoline carriages were favorably commented upon by others who that day saw the carriage run.

The mechanism is the embodiment of simplicity and, what is more, is very easy to get at, a matter of no little importance in the modern automobile. It has two speeds forward and a reverse. It carries six gallons of gasoline, but this quantity could easily be much increased if necessary. The vehicle weighs 900 pounds.

Notes on Lubrication

BEFORE a recent meeting of the Chicago Automobile Club, a paper was presented by Mr. John R. Markle. The title of the paper was "The Hydromechanics of Lubrication." The object of the paper was, primarily, to start a line of thought on the subject of lubrication, and after its reading a very free discussion took place. Among other things Mr. Markle referred to the primitive methods of lubricating, leading up to the plans now followed. He said:

"From the time when primitive man first began to lay hold upon physical forces and train them to serve him through the mediumship of tools and machinery, there co-existed the necessity of lubrication.

"As improvement advanced rapidly, populations of many countries expanded, and the industrial field broadened correspondingly until within the nineteenth century—just closed—the power and scope of machinery had so multiplied the hand of man in production as to set all nations up in the present day pseudo competitive struggle for disposition of surplus materials. There appears, however, not to have been a corresponding advance in mechanisms for lubricating the great mass of diversified machinery of the world. Lubricants of competent character there appears to have been in abundance, but methods and mechanism for application remained crude in form and limited in scope.

"Mechanical or hydrodynamic machines are at present manufactured of various forms and capacities, all possessing greater or less merit over all preceding devices designed for lubricating machinery. As with many other machines and devices, the United States of America has doubtless taken the lead in the excellence of this class of machines produced.

"In the foregoing I have stated some well known general facts, such as, that in proportion as the use of machinery dominated any industry, it increased the output, improved the quality and lessened the cost of the product or results. 2d. That two such widely divergent results as perfected illumination and lubrication, show that securing of each was by the utilization of machinery for other things. Please to note here that neither light or lubrication are entities and that the competency of machinery with these affords us the strongest possible illustration of its momentous utilities. 3d. Parallels were briefly sketched touching progression in these two cases. 4th. It was

shown how dangerous and damaging a little knowledge can be and how such tended to delay progress with lubrication. The simple understanding that a revolving journal would naturally carry a film of lubricant to its working surfaces if placed upon its circumference, has kept the world for centuries chasing the hand oil can, or 'growler.' We are in the morning of better things.

"5th. It was shown in conclusion what factors would determine for ideal lubrication, and that the United States of America was leading in the van toward the final accomplishment."

There does not appear to be as much attention given to the matter of lubrication as the subject demands. When it comes to the operation of automobiles this matter is of very vital importance, and can scarcely be over-estimated. The "squirt can" method is not at all suited to automobiles. An automobile to be properly lubricated in those parts where oil is necessary, must be fitted with an equipment which will give a positive uniform service, and when the effects of heat and cold will be overcome. It would seem as though other countries had given much more consideration to this matter than we have in America.

A Double-Acting Brake

THERE can be no doubt whatever that many of the dangers now attendant upon automobiling might be eliminated if the brakes used were more correctly designed and made more efficient. Quite frequently one reads of automobile accidents due in some way or other to the failure of brakes to act just at the time when most desired.

A number of brakes are now on the market which, it is claimed, will hold either backwards or forwards, the value of which will be recognized, especially when it necessary to stop while climbing steep hills.

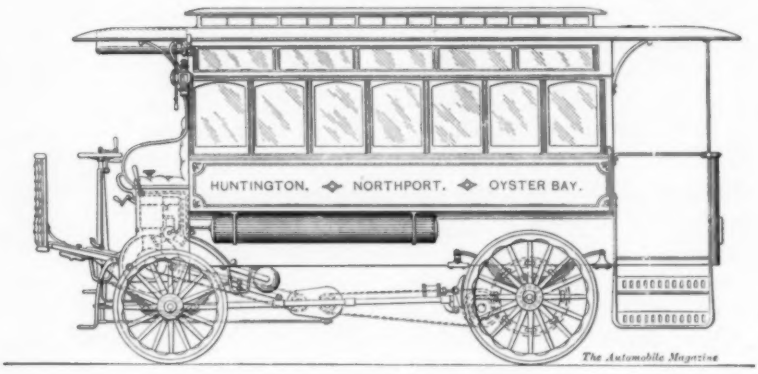
One made by the Hills' Loco Brake Company, of Bridgeport, Conn., is said to be very efficient, and takes hold instantly, backwards as well as forwards. While the device is simple in design it is quite effective. The operation is somewhat like a pair of shears in bearing upon the sprocket wheel. It is stated also that it is even more powerful when the carriage is traveling backwards than forwards.

'Buses for Long Island

THERE cannot be any doubt that the automobile 'bus will continue to grow in favor, and from various parts we hear reports of companies being formed for the purpose of operating omnibus lines.

In this connection it gives us pleasure to present an illustration of a vehicle now being built by the Jas. H. Lancaster Company, 95 Liberty Street, this city.

These 'buses are to run between Huntington, Northport and Oyster Bay, L. I. They will carry from fourteen to eighteen passengers.



Automobile 'Bus for Long Island

An interesting point about these vehicles is the power-steering device. This is done by means of compressed air. There is, however, the usual hand-wheel steering arrangement, as shown. It is very tiring to rely only upon this hand method in navigating a conveyance of this size, and the power-steering does away with this. The engine is of the 4-cylinder type. This is carried in front, a chain drive, by means of a countershaft, transmitting the power to the rear wheels. Both power and hand brakes are used. Compressed air is used for the application of brakes, the horizontal air receiver being shown at side. The motor is of 16 horse-power. It is water-cooled. There are three forward

speeds and reverse. Enough fuel and water can be carried to run about 35 miles.

They are 18 feet in length. The front wheels are 36 inches in diameter, while the rear ones are 42. Steven's solid tires are used. These are made up of layers of rubber and linen, and are especially adapted for heavy vehicles.

These 'buses ought to prove highly efficient, and every means have been taken to insure a safe and reliable service between the towns mentioned on Long Island. The Long Island Traction Company, of which Wm. P. Miller is President, has ordered thirty carriages built on similar lines to those intended for the Huntington and Oyster Bay route. The 'buses intended for the latter company will, however, be of sufficient size to hold between twenty-five and thirty passengers. These are to run between Rockaway Beach, Mineola and Southport.

The Long Island Traction Company's franchises include all routes through all of the incorporated villages, and also all of the lower part of Nassau County. Jamaica has become the distributing point of the Long Island Railroad.

As the State law forbids using all trolleys on the macadam roads, and as practically all of the roads are macadamized, the automobile stage business will monopolize the entire passenger and express-freight traffic.

(We desire those interested in both the manufacture and operation of Automobiles to send in for use, in this department, whatever they think may be of interest to us or our readers.—EDITORS.)

A Visit to the Motor Manufacturing Company, at Coventry

THE Motor Manufacturing Company probably owns the largest works in Great Britain. During a recent visit to Coventry, owing to the courtesy of Mr. Iden, we were shown all over the premises. They well repay inspection. The firm now manufactures almost every single portion of a motor car and possesses the most recent improvements in French and American machinery, in addition to much of the finest English make. Mr. Smith, the Secretary, kindly placed his valuable services at our disposal for a couple of hours. First, he showed the frames of the new miniature Panhard voiturettes in course of construction. They were fitted with a 5 horse-power engine made by the company and which develops 6 and even 7 horse-power. These voiturettes are built throughout on Panhard lines, having three speeds and reverse, the top speed giving nearly thirty miles an hour. The transmission is patented by Mr. Iden, and consists of spur wheels always in mesh. These little carriages weigh about seven hundredweight, and we were informed that so great was the demand for them the firm were working night and day to execute orders. Their price is $1,100, and with their powerful engines and finished workmanship they supply a public want.

Next we passed to the larger cars of 8, 12, up to 30 horse-power. One of the latter is entered to compete in the Gordon-Bennett race. The magnificent workshops were full of man-saving machinery, each performing its allotted task with scrupulous exactitude. Some cut gear wheels, others were employed in fashioning cranks from the rough into their ultimate polished and mathematical condition; in short, there was no limit to their functions. Passing into a large accessory shop, we were shown carbureters in every course of con-

struction—induction and exhaust valves, nuts, screws and the thousand and one requirements of a modern motor.

Ascending to the second floor, we entered the department where bodies of every shape and size were being built. They mostly had aluminum panels, and the favorite "tonneau" back was much in evidence. The firm, however, display great ingenuity in their designs. Hitherto English motor cars have been distinguished more for solidity than elegance. They have been built high from the ground, with too short a wheel-base, too much weight and too little attempt to please the eye. But this state of things is being rapidly superseded, and the symmetry and grace of foreign productions is daily making itself apparent in cars of British manufacture. In olden days there was the same difference as exists between a cart horse and a race horse. But the majority of the cars building at the Motor Manufacturing Company now possess the rakish appearance of their French neighbors. Every detail was well thought out, strength was not synonymous with clumsiness, and they wore that courser-like look so dear to the heart of the true autocarist.

In short, it may be briefly stated that English cars have made immense strides during the last twelve months, and with very moderate encouragement from the authorities are destined to take a high place in the world's array of horseless vehicles. From the body shop we passed to that where wheels of every size and weight were in course of construction. It was most interesting to watch the wonderful precision with which a special machine not only cut the wooden spokes into lengths but also made the flats upon them. Its accuracy ensured a truly built wheel, and we learned that the firm are justly famous for their wheel building. This proved a highly interesting department and we lingered long.

Next we were conducted to the engine-testing shop, which perhaps was the most fascinating of any. An original De Dion motor stood on a bench. We were pointed out the improvements made by Mr. Iden in the engines which he manufactures. Last, but not least, we visited the casting shed, and were shown the casting for a 30 horse-power engine and also those for the aluminum single clutches which the firm are now fitting to all their cars. The time flew, so absorbed were we and so deeply interested. Mr. Smith proved a most able conductor, and thanks to the lucid manner in which he explained things we came away much impressed by all we had seen and learned at the Motor Manufacturing Company's establishment.

MARKET HARBORO, ENGLAND. MARY E. KENNARD.

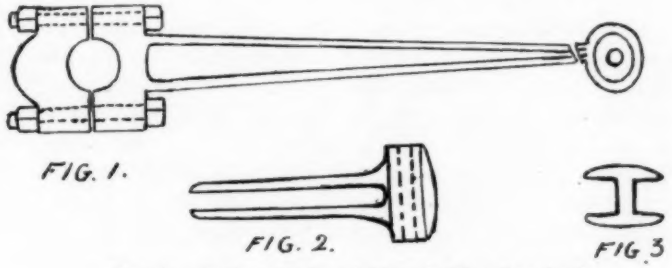
A Quick Repair Job

OUR esteemed contributor, Dr. Herman B. Baruch, recently told us of a piece of repair work which, to our minds, is worthy of some notice. It was performed rapidly, and upon a foreign-built machine, with which the mechanic interested was entirely unfamiliar. Below is printed a letter from Mr. Nat. Roe, the machinist who did the job, and it will be read with interest.

EDITOR AUTOMOBILE MAGAZINE:

Am very glad to give you the information asked for. Of course, it would not have been anything exceptional had it not been for the place where it happened, and also the time when it occurred.

Dr. Baruch and Mr. John Masury started from New York City for Moriches, L. I., to spend the night. They started on Saturday, expecting to return next day (Sunday) as the Doctor was obliged to



Showing Broken Rod and How it Was Repaired

get back at that time. The machine broke down at Merrick, L. I., which is about thirty-five miles from here (Patchogue). It was found that the connecting rod of the engine had broken near one end, and, as they recognized, it was quite a difficult thing to repair; they decided to let their man take out the broken part and bring it to see if I could repair it. At the same time, they concluded they would take the train for Patchogue with the idea that they would borrow my machine and go on to their destination (Moriches).

Their man did not reach my shop until 7.30 in the evening, and as the only train for Merrick next day (Sunday) left at 8.03 a. m., I was compelled to repair the rod that night. It was rather a peculiar job to do, as the part could not be welded on, it being broken too near

the end; so I had to make a new end and weld the same to the remaining part of rod. Fig. 1 will partially show how it was broken.

You can see that I had to forge out a new end so that it had a longer stem on it, so that I might weld it, and as the rod was made with flanges, as in Fig. 2, the piece I made had to be split, as in Fig. 3. The end had a brass bearing. This made the crank larger and harder to make, as I had to drill out from the solid piece of steel, by foot power, as the fire in our boiler had gone out. I took the 8.03 train Sunday morning for Merrick. Upon arrival, we went to the barn where machine was, and found the building locked. Not finding anyone around, we finally broke in the same, and to my surprise, found the machine all apart; the engine out of the carriage, and everything disconnected. As I had never seen a Darracq machine before, I did not know much about what I was doing or about to do, and the man had failed to mark any of the parts, gears, etc. As he seemed to know practically nothing about the machine either, you can readily see that it was rather a difficult job for me to set everything together in their right positions. However, we set to work and just about finished as the Doctor came in with my machine, which was about 5 o'clock p. m. It resulted very satisfactory for it so happened, that there were no trains either way the remainder of that day in order that we might get to our homes. As it was, each took his own machine and went home, and from all accounts each arrived quite soon and in good condition. I had no trouble whatever with my machine for the thirty-five miles, and made the trip in two hours, the last twenty miles in one hour flat (after dark).

PATCHOGUE, L. I. NAT. ROE.

A So-Called Explosion

ONE of our enterprising newspapers recently pictured an automobile explosion which gave one the impression of a serious disaster. On the day the article appeared several spoke of the matter to the writer, knowing of his connection with the automobile industry. From a very reliable sources we learn that the facts as set forth by our esteemed contemporary were seriously erroneous. Now, these distorted reports are damaging in more ways than one, and it is only fair that the real facts of these so-called explosions should be given to the public.

The gentleman who happened to drive the machine, the gasoline

tank of which, according to our contemporary, exploded, was E. A. McDuffee, the well-known cyclist. Mr. McDuffee sends us the following letter, which we print in toto. It gives the real facts of the case :

EDITOR THE AUTOMOBILE MAGAZINE :

Yours received, and you know that the daily newspaper was just anxious to have a chance to print and picture a burning automobile. True it is I started to Washington with one of the finest and fastest machines I ever saw, and true it is I slightly burned my hand through my own carelessness, but not enough to keep me from writing you this letter with it. The wagon was scorched and not more than many you have seen in the streets of New York from simple causes.

The fault was fully my own, and would not happen again in a lifetime. There were no explosions as printed. Now, I have taken the trouble to write you this, and I wish you would print it word for word as, no doubt, the papers would make one think there was an earthquake.

BOSTON, MASS. E. A. MCDUFFEE.

Wire vs. Wood Wheels

IN the matter of wire vs. wood wheels, there is but one decision, which is in favor of the wood wheel. First, the wood wheel has been proven right by years of use, and it is folly to throw away the benefit of this experience to take up a new device that is more complicated, more costly, less durable and less well proven. In order to make a wire wheel withstand side strains the spread of the hub must be quite great and when this is done the spokes contact with curbing and with the hubs of other vehicles. If the spokes are radial they have no driving strength and if tangential they are not easily cleaned, with the result that they soon look badly and rust quickly. If you will take the trouble to walk through a storage station and compare the wood and wire wheels in the matter of cleanliness you will realize the importance of this latter point. The wooden spoke is so mounted that it is strong in all directions and meets every strain perfectly, whereas the wire spoke is strong only in the direction of its length.

The motor vehicle is a vehicle, and the experience of vehicle

users is stronger than any argument on the other side. Further, foreign motor vehicle makers have tried both wire and wood wheels, and are almost universally in favor of the wood wheels. Old concerns in this country, like Haynes-Apperson and the New York Electric Vehicle Company, have discarded the wire wheel in favor of the wood. So long as these facts are in existence, argument will seem needless, and the wise builder will devote his energies to details of the problem more essential to success than the question of wheel to be used. Out of the thousands of inquiries for vehicles we have had but two or three who have asked for wire wheels, and we think it would be folly to offer an article unless there were good reasons for its existence and a demand for the same.

READING, PA. C. E. DURYEA.

More About Horse-Power

APROPOS of my former letter on horse-power there is a little more I wish to say on the subject. I showed the difference in power required, figuring on the same basis for both, but it might have been better to have gone a step further and take a look at the weight of machines in connection with the power.

Taking a machine like the De Dion, weighing say 700 pounds and having a 3½-horse motor, and it gives 200 pounds of carriage per horse-power, the 5 horse-power at 750 pounds is 150 pounds per horse-power. One of the heavy machines weighing say 1,800 pounds, and having a 10-horse motor, gives 180 pounds per horse-power, or practically the same for the work done.

When we come to add the weight of passengers, however, the heavy machines show up a little better, as the passengers add a larger percentage to the weight of the light machines. Calling the weight of two persons 300 pounds and we have 1,000 pounds for a 3½-horse motor, or 285 pounds per horse-power. With a 5-horse motor it becomes 1,050 pounds total, or 210 pounds per horse-power. The large machine mounts up to 2,100 pounds, or 210 pounds per horse-power, the same as the other.

I have not touched on grades at all, and it may be well to remind drivers that hills as well as speed take a lot of power. My engineering friend gave me these figures, taken from some tests on English

roads by Gayffie and Parnell. The figures show the increased power necessary for grades, power on level counted as 1.

Grade in per cent.,	1,	2,	5,	10.
Power required,	1.1,	1.23,	2.5,	4.

When we stop to think that a ten per cent. grade takes four times the power it does to run on the level, our admiration for the machines that take us up at a good speed increases to a marked degree.

PASSAIC, N. J. HENRY FRANKLIN.

Engine Designing for Automobiles

HAVE we any mechanics that are able to design and build a small durable steam engine? Looking at one of them (and the said one having either twin brothers or sisters) from a mechanical point of view, it would appear as though it were made for the babies to play with more than a vehicle to travel over a rough country road. Excuse this criticism, but these toy-like engines are not only toys in size but also in design. This is a sad reflection on the intelligent American mechanic, and it is about time we had a few plain-spoken facts. How long will the game hold out—how long will these engines stand it? One season possibly, and after that the deluge. The ever-recurring bill of repairs; crosshead wearing out, guides wearing out, links and blocks and small pins all need renewing occasionally.

What is a pound or two of metal? No need of this paucity of metal. Steel is cheap enough, and duplication is now so well carried out with jigs and special tools that the cost of labor cuts only a small figure in the total cost of a small steam engine.

Is there any company that will rise to the occasion and give us a steam engine that is durable, that has got liberal wearing surface on crosshead and guides to last at least one season, that can give us a valve gear that is serviceable?

A short time ago I paid a visit to a machine-shop friend and he had just completed one of these small link blocks about ½ inch long and ⅜ inch wide with ¼-inch hole for pin. It was to replace one that was worn out. I suggested that the valve had to be set. "Oh, no; it was very difficult to get at," and so it remained as it was. I forgot to say that there had been other repairs done to the links in addition to those previously alluded to.

Now, some of us are aware that according to locomotive practice

the proper thing to do would be to set the valve, and on such a small engine it should be within 1-64 or possibly 1-100 of an inch to give good results. But after these repairs, where was the valve? No one knows.

The next thing that will happen will be that the boiler perhaps does not steam properly. Of course no one ever disputes that assertion, so the poor boiler has to take the blame of the defective valve motion. Or possibly the engine is not so smart as she once was, especially on the hill. Let us analyze this a little. The valve is not in correct position. The admission of steam is imperfect, also the exhaust and expansion, as the three functions are all combined. The engine makes, say, 500 revolutions per minute. There are three defects in one stroke, six for each revolution ; $6 \times 500 = 3{,}000$ per minute, 180,000 defects per hour. Is it any wonder the boiler does not steam or that she is not smart on the hill?

The automobilist ought to have a lever and engine that is just as reliable as the lever in the cab of a locomotive. Dear Mr. Manufacturer give us a toy engine in size only but give us a giant in design and workmanship, and, in preference to ball bearings that break balls, go back progressively to the old reliable style of bearings. Be honest with the automobilist, and in conclusion the company that manufactures that good durable engine will probably get the best wishes for success from automobilists everywhere. HAMLET.

Book Review

CONSTRUCTION of Roads and Streets. By William H. Maxwell. Some one has said that the history of roads is the history of civilization. This is, undoubtedly, true. The book before us is full of interesting and valuable information regarding the construction of roads. Good roads are among the most influential agencies of society, and as a matter of fact road makers have proved the most effective pioneers of civilization. The historical part of the valuable treatise is of great interest. The author deals with all phases of the subject. He takes up the matter of traction on roads, drainage, various kinds of pavements, cost of construction. For these interested in any way in the building of roads this book ought to be a mine. Numerous tables and illustrations are included. Contains 260 pages. Published by St. Bride's Press, 24 Bride Lane, London, England. Price three shillings and sixpence.

The Crest Sparking Plug

THE Crest Manufacturing Company of Cambridgeport, Mass., have been putting sparking plugs on the market for one year. The demand both in this country and abroad has reached to an extent that justifies them in manufacturing these plugs by special machinery. Not only is the quality of the product improved, but it has also cheapened the cost of manufacture, and they have decided to give their customers the benefit of this reduction in cost in the quotations of their plugs, which is the same the world over. The price of these is $1.25 each, a liberal discount being given on order for a large quantity. They find that the demand has been greatest in regard to the style of plug which is universally used in Europe. For this reason they have got out what they call a Crest Special Indestructible Sparking Plug, having either the French metric thread or a standard 16 thread to adapt it to American taps. The plug consists of a shell of steel having a thread at one end to screw into the orifice of the chamber of the motor. Through this shell is a tapered hole in which the insulating cone is inserted, making a perfect gas-tight joint. Above the shell and fitting around the upper part of the cone is a cup of insulating material. A nut on the metallic stem, which passes through the cone, holds the several parts of the sparking plug together. A nut on the metallic stem crews onto a metallic washer, which takes care of the difference of expansion between the insulating material and the metallic stem. On this shell is a binding nut which is partially split, having a small extra binding screw, which has a special locking device to prevent the nut loosening. This is an important improvement, as it is well known that vibration will loosen the ordinary lock nut. This sparking plug, on account of its peculiarity of construction and the material used, is unaffected by expansion and the intense heat of the motor.

Crest Sparking Plug

Private Plants for Charging Electric Vehicles

THERE are many owners of electric automobiles who are now looking into the matter of plants for the charging of their carriages. There are a number of concerns now in the market supplying dynamos for this purpose. The firm of Palmer & Olson, 210 Centre Street, this city, manufacture dynamos especially suited to this work. Already they have a number of machines in such service, giving eminent satisfaction. It must be a decided convenience for owners of electric machines to thus be able to charge their batteries. These dynamos are simple, require practically no attention when once started and are clean. They are made in various sizes.

One well-known automobilist in this city uses a dynamo of this kind in connection with his electric vehicles. He drives it by means of a gasoline engine, and it costs him but 5 cents per hour while charging.

Motor Vehicles for Heavy Service

MR. E. Shrapnell Smith, Secretary of the Liverpool Self Propelled Traffic Association, sends us an advance copy of his recent address before the Liverpool Chamber of Commerce. It is with pleasure we present herewith, abstracts from the address and trust our readers will find in it food for reflection.

There can be no doubt that the use of automobiles for the transportation of merchandise will develop to a considerable extent, and many persons are giving much attention to the subject.

The members of this Chamber were addressed on the subject of "Motor Vehicles for Heavy Traffic," at the invitation of your President, Mr. Alfred L. Jones, on September 9th, 1896, by Mr. Worby Beaumont, when the concluding piece of advice given was—"Stick to your horses for the present." That parting sentence is scarcely to be wondered at when one remembers that the Light Locomotives Act had not then come into operation, but since that date, and largely through support provided by some of your members, the Liverpool Self-Propelled Traffic Association has been successful, by means of meetings, addresses and competitions, in directing public attention to the impor-

tant future which lies before modern applications of mechanical power to goods haulage on common roads. It is generally well known, I think, how the wheels of the vehicles which competed in the 1898 trials proved structurally defective when subjected to the hammering action of granite sets and cobble-stones, whilst other minor troubles, *e. g.*, with the condensers and in respect of adhesion, justified that 'sitting on the fence' which was the policy adopted by our Liverpool team owners and ship owners.

We have at hand in the self-propelled lorry an inoffensive means of conveying raw materials or merchandise from point to point without the intervention of any handling or breaking of bulk, in addition to which, cartages are absorbed into the one journey and terminal delays are avoided. No elaborate preliminaries are required; neither Parliamentary powers nor permanent way.

We ask, not unnaturally, at what cost can this service be performed? Well, fortunately, there is now the several years' experience of users in various parts of the country, and to their records I have had free access. The following tables of working costs have been compiled most carefully from actual results, with extra charges to compensate for the bad condition of Lancashire roads in many parts of the county, and it is satisfactory to find that they corroborate the Judges' estimates of the previous trials and the curves of costs included in Professor Hele-Shaw's paper on "Road Locomotion" before the Institution of Mechanical Engineers twelve months ago.

ESTIMATES FOR LANCASHIRE OF THE AVERAGE ANNUAL WORKING COST OF MOTOR WAGONS, ACCORDING TO ROADS AND LOADS.

Class of Work.	Weight Capacity.	
Per week { 70 hours under steam. 5½ days. 50 weeks per annum.	Self-contained Motor Wagon 4 tons.	Motor Wagon and Trailer. 7 tons.
PRIME COST—	£600	£675
Interest @ 5% per annum	30.0	33.75
Depreciation @ 15% per annum . .	90.0	101.25
Fuel—Furnace Coke @ 15/- per ton .	63.0	94.5
Wages—Driver @ 35/- per week .	91.0	91.0
Assistant @ 17/6 per week .	—	45.5
Repairs and adjustments	75.0	90.0
Water, lubricants and sundries . .	20.0	25.0
Insurance	12.0	15.0
Total per annum	£381.0	£496.0

Vehicle-miles per annum (280 days).			
(A) On bumpy and badly paved roads; 30 miles per day		8,400	8,400
(B) On average granite sets, &c., 35 miles per day		9,800	9,800
(C) On good macadam ; 45 miles per day		12,600	12,600
Net ton miles per annum.			
A . . .	with full load . . .	33,600	58,600
	with ¾ load . . .	25,200	44,100
	with ½ load . . .	16,800	29,400
B . . .	with full load . . .	39,200	68,600
	with ¾ load . . .	29,400	51,450
	with ½ load . . .	19,600	34,300
C . . .	with full load . . .	50,400	88,200
	with ¾ load . . .	37,800	66,150
	with ½ load . . .	25,200	44,100
Cost per net ton-mile.			
A . . .	with full load . . .	2.7d.	2.0d.
	with ¾ load . . .	3.6d.	2.7d.
	with ½ load . . .	5.5d.	4.0d.
B . . .	with full load . . .	2.3d.	1.7d.
	with ¾ load . . .	3.1d.	2.3d.
	with ½ load . . .	4.7d.	3.5d.
C . . .	with full load . . .	1.8d.	1.3d.
	with ¾ load . . .	2.4d.	1.8d.
	with ½ load . . .	3.6d.	2.7d.

These results are to be obtained from a motor capable of dealing with no larger unit than one of seven tons when fully loaded, *i. e.*, 4 tons on the motor wagon and 3 tons on a trailer, this being the maximum obtainable under the 3-ton limit.

There are a great many people who are losing much genuine pleasure owing to their indecision in the matter of purchasing automobiles. They are waiting for the time when the automobile will not only be cheaper but give less trouble, make less noise, etc. There has never been a new thing which in so short a period has experienced such remarkable development. Those who are waiting for the perfect automobile are not aware of the great pleasure they are missing. Gradually, however, the public is coming to the realization that the horseless vehicle is a hard and cold actuality, and seeing fewer ghosts of horses than even a year ago. It is very seldom, now, that one sees the backward glance as a motor carriage passes. They seem to be the rule rather than the exception. The automobile is fast be-

coming popular, and judging by the growth of the industry during the past twelve months even, great things ought to be accomplished before another year has passed. There is a peculiar fascination about automobiling. In almost every instance where one rides in an automobile for the first time there is a desire to try again. It is, perhaps, not easy to say why this is so, but it is true.

The Enthusiasm of Beginners

By ROBIN DAMON

I HAVE had a Winton carriage a year, and now that I sort of understand how the thing is made I get along nicely. At first, when matters went badly, I was disposed to criticise the makers in no uncertain tones, for it seemed as though all the troubles were caused by poor workmanship and faulty construction. I am now inclined to the belief that my ignorance and gross carelessness contributed largely to the series of misfortunes with which I was beset for weeks. After nearly every trip there was something for a machinist to fix, and it was rare that I could go out two days in succession. For six months, however, I have had little trouble, and seldom call upon the machinist. I have no difficulty in going any distance, and have more than once run 150 miles in a day—once going 163 miles. Occasionally something goes wrong, but I am usually able to quickly locate the difficulty, because I can tell instantly if the machinery is not running right. At first, everything was "right" so long as the wheels turned around, and that is where my troubles commenced.

When I look back over the experiences the carriage has been through, I now wonder that anything is left of it, for I used to pound over rough roads at top speed, yank the clutches in, forget the oil, and do other similar careless things.

I have two friends who have just bought second-hand Wintons, because they didn't have patience to wait for new ones, after getting the automobile fever in their veins. Naturally, they look upon me as something of an expert, and frequently ask for advice. My first instructions were to put the carriages into a machine shop, and have them well cleaned and properly adjusted, for there is a man here who understands what to do. Both machines had been standing all winter and they were covered with dirt and grease, while the batteries were in bad shape. The new owners said they would take my advice, but when the machines were run out they puffed along at good speed, and both decided they were all right, even though there were several kinds

of rattles and grinds from the interior, to say nothing of leaky water tanks. After a short ride with each, I again proffered advice about going to a machinist, but both said repairs or adjustments were unnecessary. And so they clattered on.

In addition to being out of adjustment, gummed up with old oil, poor batteries and spark points, the machines had to stand the tremendous strain of beginners. For instance, I saw one started from a dead stop by jumping in the high speed lever, while the engine was going at top speed. "Just see 'er go!" yelled the operator, as he whirled off. He did not mind, even though the gears went together with a terrible jar—the wheels turned, and that was what he wanted to see. When stopping, both engines are allowed to run about 500 revolutions, although I have shown how the governor can be regulated to reduce the speed. Both owners say they are afraid the engine will stop. In starting up, they invariably speed the motor as fast as it will go, and then jerk in the lever.

In a weak moment I consented to go on an afternoon's run with one of the amateurs. He had promised to have a machinist go over his carriage carefully, but when we started he excused having that work done, by saying the carriage was working finely and did not need anything. Yet he could not go over ten miles an hour, and his high speed clutch had lost its set-screw, so that every time the clutch was thrown in it made a terriffic racket. I worked an hour getting the machine so it would run at decent speed. We went then about eighty miles, during which I had to do something to the carriage about a dozen times; one trouble being the electric wiring, which, instead of being flexible, was of ordinary bell wire. It kept snapping off. I was running my own carriage, which never gave a bit of trouble.

We were within six miles of home when my friend's vehicle stopped short. It was then dark, and I could not locate the difficulty, although I worked until 11 o'clock. At length, tired and disgusted, we decided to tow the disabled carriage. We had a piece of rope, but it snapped. Then we found a wire fence, from which we took about fifty feet, and from this we made a strong cable. I towed the carriage six miles, all the way up hill, going on slow speed. At 1:30 a.m. it was voted that the rear carriage should be left in a farm yard, and all four passengers should ride home in mine. We soon started in that way, and went along finely until we reached a spot where there was nothing but trees. Then the motor stopped, because the gasoline was used. We hunted around and found a farmer who knew a man who was in the habit of using gasoline. It was secured,

but was useless, for it had been standing uncorked for several weeks. Then we gladly accepted the farmer's offer of his horse and wagon and rode home, arriving at 4 a.m. The next morning we went after the machines, and found the reason the first went to sleep was a weak battery. Mine was all right after getting fuel.

A few weeks ago I went out in company with a steam carriage, and the operator stopped forty-five times for water, gasoline and repairs in going twenty-five miles. It took five hours to make the journey. And all the repairs were caused by carelessness in letting the stop cocks of the steam pump work off, because they had not been tightened before starting.

When I see the way beginners handle their machines, and the strain they put the gears to, I now do not wonder that builders are so prone to put the blame for accidents on the owners. Just a round iron ball rolled along the streets would get nicked if it went through the experiences some automobiles encounter.

The gentleman with whom I went on the eighty mile tour met me the following day, after he had put in a new battery, and said, "I shall not have any more trouble." Only a short time afterwards he telephoned me, at five in the afternoon, that he had been working since eight that morning trying to start the motor. I went to his aid, and found he had left the carriage standing in the rain, and also, that he had bought gasoline of a pedler, such as is used in a cook stove. After trying twice to start the motor, the operator took out the spark plug, readjusted the wires and did other things. It took me two hours to put the machine together right, and then, after getting a good spark, the low-grade gasoline would not give out gas. I let a gallon run out, and, after a few trials, the engine commenced to move.

I looked over the second carriage and found the rubber tube leading to the air valve was weak and leaked, so that the engine would race all the time. I suggested a new tube, but after a week, I occasionally hear the carriage going by, with the engine running as fast as it can.

When such people as the two men I have cited get hold of an automobile there is bound to be trouble, for they will not listen to advice. I imagine there are a good many others of the same sort. If they have any trouble, they immediately commence to use profane language. In the hands of a careful, intelligent man, who can have access to instructions when necessary, I think that almost any of the well known automobiles will give reasonable satisfaction.

One Hundred Miles in the Rain

By HERMAN B. BARUCH, M. D.

THE Long Island Automobile Club certainly deserves great credit for the well conducted endurance test which was run off Saturday, April 20. The course was selected with much discretion and could not have been improved upon. Had Jupiter Pluvius been in kinder mood the trip would have been simply ideal.

The start was made from Pettit's Hotel, Jamaica, and the sight

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Little "Tommy De Dion," the Youngest Competitor

afforded by the crowded yard before the start was most interesting. It reminded one of the paddock at the track before a race. The neigh and stamp of horse were replaced by the whirr and buzz of motors, each chauffeur busy grooming and filling his machine. Begoggled, capped, leather-coated and oft booted, the drivers presented a rather grewsome and amusing appearance.

The pet of the crowd was little "Tommy De Dion," as he has been dubbed, a fifteen year old boy who manipulates a machine with a skill and dexterity much envied by many of his elders. The writer had a Darracq 6½ horse-power voiturette, and was the third contestant started toward Flushing.

This is, indeed, an ideal road, and there is no sport comparable to "bubbling." We dare not exceed fifteen miles an hour, for just ahead at Flushing a terrible fellow is waiting, watch in hand, to catch us and disqualify us if we get there before twenty minutes have elapsed. An immense racing machine went whizzing past us, unmindful of its fate, and Mr. Birdsall, my traveling companion, cautioned me to slow down, when I already seemed to be moving at a snail's pace. "Don't hurry, old man, take it easy; this is an endurance contest, not a race," was his constant admonition. But my brave little Darracq was champing at the bit, and almost bolted when another chap raced by.

But now it begins to drizzle and blow a regular gale from the East, and before Port Washington was reached we were thoroughly drenched. Our motor, much to our disgust, now began to slow down. We crawled along for a few miles and just before Roslyn was reached she began to pick up again, and off we raced at a thirty-mile clip to make up for lost time; but, alas, the spurt was short lived! Again she began to choke and splutter like a croupy child, and we had to crawl up the Roslyn Hill where we had expected to make a good record in the hill climbing contest. Mr. Birdsall suggested the carbureter as the seat of trouble, and we made a stop of three minutes, during which he filled the gasoline tank and I looked over the carbureter. I found it coated with ice, caused by the excessive moisture in the atmosphere being congealed by the cold consequent upon the rapid evaporation of the gasoline. We plugged up the air holes and so the mixture was too rich and we got no speed or power. It was the work of a few seconds to clear the apertures with a twig, and with a turn of the crank we were off again, going beautifully. Whenever the same symptoms threatened this treatment was repeated, but without stopping the carriage. The driver first slowed down the carriage, then with one hand on the steering wheel, and leaning well out and forward on the step, the air inlets were cleaned and we went on our way rejoicing. In fact, we went on rejoicing too much, because when we reached Oyster Bay we were within ten seconds of being disqualified for excessive speed.

Poor little "Tommy De Dion," was soon espied in trouble by the roadside, and we could not stop to help him.

It is now raining in torrents, and the water, driven by a strong head wind, soon soaks us both to the bone, but the motor is running beautifully and our enthusiasm causes us to forget everything but the

fact that we are covering the ground at a good rate and everything is running smoothly.

The new Columbia gasoline runabout overtook us shortly, but we had a few links of speed in reserve and could not resist the temptation to fly by them and risk disqualification once more. The extra spurt has caused us to shake up the mud and some of it getting on the trembler, which unfortunately has no cover, brought us to a sudden stop, much to our disgust. Only one minute was wasted in starting the motor again, but even this sufficed to bring up the Columbia accompanied by the steadily running and seemingly imperturbable Haynes-Apperson four-seater. Do what we could, we could not induce the

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President L. R. Adams Giving Final Instructions

chaffeur of this machine to make a spurt, but in the words of the poet, "he got there just the same."

We traveled along together for a while, but with visions of a rapidly emptying tank of gasoline, requiring refilling, the necessity of speed urged itself on us if we wanted to get in before our competitors. We made a ten-mile spurt, and soon had to stop again on account of that trembler. My wagon had been but a short time in this country, and I had made no effort to doctor it up for this run, as my object in entering the contest was to find its weak points and remedy them if possible, and I found only two, the uncovered trembler and the unprotected carbureter.

On we went again, and soon passed Massapequa and rushed on to

Springfield, where we replenished our gasoline tank from a reserve can and wasted another two minutes, but were not overtaken by any of the others. Charley Wridgway, who had started on an imported De Dion Racer, yelled something from the roadside which sounded like "you are second," but which afterward proved to be the statement that he was "short-circuited." Our lunch was rain-soaked, but I managed to eat a couple of sandwiches which Mr. Birdsall dug out for me, and washed them down with mouthfuls of rain water which was coming down in sheets.

Jamaica is only a short distance away now, and there is very little gasoline left in the tank when the motor again halts us, but it is only another bit of mud on that blessed trembler, and we are soon off again. Oh, for another gallon of gasoline, but none is obtainable. With one eye on the rapidly vanishing essence and the other on the road, we make the last left turn, and with one grand burst of speed our brave little Darracq bears us bravely back to the starting point, where we were enthusiastically received by as mud be-spattered and forlorn looking lot of motor enthusiasts as I have ever seen.

We had covered the course of 100 measured miles in seven hours and six minutes, and been delayed less than ten minutes on those muddy roads. This, when one considers that absolutely no preparation was made for the run, I think should be accounted a most excellent performance for a new and almost untried car.

Cravenette Automobile Suit

SEVERAL of our leading men's outfitters in this and other cities have gone into the manufacture of automobilists' suits, caps, etc. Most of them, however, have confined themselves to the heavier styles of suits more suitable for use in cold weather. In this connection our readers will be pleased to know that Smith, Gray & Co., the well known men's outfitters, are now offering to the automobile public an automobile suit which, though waterproof, is yet cool and adapted for summer wear. The material used is cravenette, and made up into a suit it looks quite neat.

Mr. C. G. Wridgway, the well-known motor vehicle and motor cycle expert, has been placed in charge of the motor and accessories department of the De Dion-Bouton Motorette Company.

Automobile Club Directory

Under this heading we shall keep a record of the motor vehicle clubs both of this and other countries, and we hope to have the co-operation of club officers in making it accurate and complete.

*Corresponding clubs of the Automobile Club of America are designated thus *.*

Automobile Club of America, S. M. Butler, Secretary, 95 Liberty St., New York; representative on International Racing Board, Clarence Grey Dinsmore; Substitute, John H. Flagler.

Automobile Club of New Jersey, Secretary, Dr. H. Power, Montclair, N. J.

Automobile Club of Baltimore, W. W. Donaldson, Secretary, 872 Park Avenue, Baltimore.

Automobile Club of Brooklyn, Secretary, C. Benton Dix, Hotel Clarendon, Brooklyn.

*Automobile Club of Columbus, O., C. M. Chittenden, Secretary, Broad Street.

Chicago Automobile Club, Secretary, H. M. Brinkerhoff, Monadnock Block, Chicago.

Indiana Automobile Club, Indianapolis, Ind. Secretary, August Kabich.

Long Island Automobile Club, Secretary, Charles W. Spurr, Jr., 552 State Street, Brooklyn.

Automobile Club of New England, Secretary, Geo. E. McQuesten, Brookline, Mass.

*Cleveland Automobile Club, L. H. Rogers, 357 Amesbury Avenue, Secretary, Cleveland, O.

*North Jersey Automobile Club, E. T. Bell, Jr., Secretary, Paterson, N. J.

*Automobile Club of Rochester, Frederick Sager, Secretary, 66 East Avenue, Rochester, N. Y.

Massachusetts Automobile Club, President, J. Ransome Bridge; Treasurer, Conrad J. Rueter; Secretary, L. E. Knott, 16 Ashburton Place, Boston, Mass.

Pennsylvania Automobile Club, Secretary, Henry J. Johnson, 138 No. Broad Street, Philadelphia.

*Philadelphia Automobile Club, Frank C. Lewin, Secretary, 250 No. Broad Street, Philadelphia, Pa.

Automobile Club of Bridgeport, Secretary, Frank W. Bolande, 208 Barnum Avenue, Bridgeport, Conn.

Rhode Island Automobile Club, Secretary, Frederick C. Fletcher, P. O. Box 1314, Providence, R. I.

Princeton University Automobile Club, Princeton, N. J. President, P. Adamson; Secretary, Charles H. Dugro.

San Francisco Automobile Club, B. L. Ryder, Secretary, San Francisco, Cal.

Columbia College Automobile Club, Lewis Iselin, Secretary, Columbia College, New York, N. Y.

*Buffalo Automobile Club, Secretary, Ellicott Evans, The Lenox, Buffalo, N. Y.

Worcester Automobile Club, Worcester, Mass., President, J. W. Bigelow; Vice-President, Edwin Brown; Marshal, W. J. H. Nourse; Treasurer, B. A. Robinson; Secretary, H. E. Shiland.

AUSTRIA.

Budapest—Magyar Automobil Club 31 Musem Korül.

Innesbruck—Tiroles Automobil Club, Rudolph-Strasse 3.

Prague—Prager Automobil Club.

BELGIUM.

Antwerp—Automobile Club Anversoir, 34 r. Longue de l'Hopital; President, Baron de Bieberstein.

*Brussels—Automobile Club de Belgique, 14 Pl. Royale; Moto-Club de Belgique, 152 Boul. du Nord; Touring Club de Belgique, 11 r. des Vauniers.

Charleroi—Automobile Club de Charleroi, Hotel de Esperance.

Ghent—Automobile Club de Flandres.

Liege—Automobile Club, Liegeois, 2 r. Hamal.

FRANCE.

Amiens—Automobile Club de Picardie, 36 r. de La Hotoie.

Avignon — Automobile Club de Avignon.

Bordeaux—L'Automobile Bordelais.

Dijon—Automobile Club, Bourguignors Cafe Americanie.

Lyon—Bicycle et Automobile Club de Lyon; Motor Club de Lyon, 3 pl. de la Bouise.

Marseilles—Automobile Club de Marseilles, 61 r. St. Fereol.

Nance—Automobile Club, Lorrain, Thiers pl.

Nice—Automobile Velo, Club de Nice, 16 r. Chauvain.

*Paris—Automobile Club of France, 6 pl. de la Concorde; Motr-Club de France; Touring Club de France, 5 r. Coq-Héron.

Pau—Automobile Club, Bearnais Ave. de la Pau, President, M. W. K. Thorn.

Périgueux—Veloce Club, Perigourdin, Hôtel de Commerce.

Toulouse—Automobile Club, Toulousain Café Riche, pl. St. Etienne Société des Chaffeurs du Midi, 25 r. Roquelaine. President, M. Gay.

GERMANY.

Aachen (Aix la Chapelle)—Westdeutscher Automobile Club, Hotel Grand Monarque.

Berlin — Mitteleuropaischer Motor Wagen Verein, I. Universitatstrasse, Herr A. Klose; Deutscher Automobil Club, Liusenstrasse, 43-44.

*Deutscher Automobil Club, Liusenstrasse, 43-44. President, S. D. Herzog, Victor von Ratilin.

Dresden—Radfahrer-und Automobilisten Vereinigung; Dresdener Touren Club.

Eisenach—Mitteldeutscher Automobil Club; Motorfahrer Club, Eisenach.

Frankfort am Main — Frankfurter Automobil Club, Restaurant Kaiserhof.

Munich—Bayer. Automobil Club, 33 Findling Strasse.

Stettin—Erster Stettiner Bicycle und Automobil Club.

Strassburg—Strassburger Automobil Club.

Stuttgart—Suddeutscher Automobil Club; Wurtembergischer Motor Wagen Verein.

GREAT BRITAIN.

Birmingham — Motor and Cycle Trades Club, Corporation street.

Edinburgh — Scottish Automobile Club.

Liverpool—Liverpool Self-propelled Traffic Association, Colquitt street. Secretary, E. Shrapnell Smith.

*London—Automobile Club of Great Britain and Ireland, 4 Whitehall Court, S. W. Hon. Secretary, C. Harrington Moore.

Nottingham Automobile Club, Secretary, A. R. Atkey, Nottingham, England.

HOLLAND.

Nimegue—Nederlandsche Automobile Club.

ITALY.

Milan—Club Automobilisti Italiani 6 via Guilini.

*Turin — Automobile Club d'Italie Via Vittorio Amedeo II, 26.

RUSSIA.

Moscow — Moskauer Automobile Club, Petrowka, Hauschnow.

St. Petersburg — Automobile Club de Russe, President, M. Delorme.

SPAIN.

Madrid—Automobile Club de Madrid.

SWITZERLAND.

*Geneva — Automobile Club de Suisse, 9 boul. de Theatre.

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A Live Journal for all interested in Motor Vehicles

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An Addition to Our Staff

WE are pleased to announce the addition to our editorial staff of Mr. Malcolm W. Ford, who is widely and favorably known to all lovers of outdoor sports. Until recently secretary of the Automobile Club of America, he has the best interests of automobiling at heart and joins our forces to assist in making the AUTOMOBILE MAGAZINE still more valuable to all interested in motor vehicles.

The Long Island Test

THE twentieth of April, 1901, will always be looked upon as an eventful day by many automobilists as well as builders. It was the day of the 100-mile endurance test on Long Island. The members of the Long Island Automobile Club deserve much credit for their work in getting up this event. The test was an interesting one, and as has already been stated it was a test of endurance vehicles for the riders as well as the motor.

The example of the progressive club on Long Island has already found a number of imitators and we hear that several other clubs are busy laying plans for similar contests. May the good work go on.

The results of these various tests will be far-reaching, we are sure. It is the best way to convince a skeptical public. Many people are refraining from purchasing because, as they say, of the liability of the vehicles to break down. All this valuable time they are losing. Take the modern automobile as it stands to-day and get out of it all the enjoyment it affords. The longer you hesitate the more real pleasure you miss. Surely the performances of the different carriages which took part in the test referred to are sufficient evidence of the practicability of the modern automobile.

Progress in America

THE following extracts are from an editorial which recently appeared in our esteemed English contemporary, *The Automotor and Horseless Vehicle Journal:* "It is now some twelve months or so since the American can be said to have really put his hand to the plough in matters of automobile manufacture. As might be expected, he has shown a characteristic grasp of the subject generally, and is displaying a resourcefulness and originality in attacking its many difficulties which make it well worth while to survey somewhat carefully the present attainments of a competitor who, in this matter, is employed in tasks as congenial to him, workman or designer, as any in which he engages, for which materials are ample and cheap, while his efforts are nourished and sustained by an expenditure of capital which is both plentiful and patient.

"We shall endeavor to place before our readers from time to time, as the results of personal visits to the United States, a careful consideration of the development of the industry in that country in a manner which we hope will be both technically and commercially instructive. As regards numbers, electric cars predominate in the United States, owing partly to the good condition of their modern streets and the facilities for charging; good motors are plentiful, and electric matters are well understood. But steam vehicles form the most interesting development of recent times in America, which has practically a monopoly of light steam vehicles, while their experience of high-speed engines has served them well.

"Steam vehicles seem, in the hands of Americans at least, to

have been more able to hold their own than those driven by internal combustion engines. This is doubtless largely due to their comparative simplicity and the avoidance of any change-speed gearing. They run silently and without smell on good town paving, and they are fairly successful on country roads. Moreover, Americans have not had much experience with light explosion engines of the right type; the two-stroke launch engines with which they are fairly familiar are less able to accommodnte themselves to the conditions which exist in the application of explosion engines to motor car work than are four-stroke motors. They have, however, made considerable advances in this direction, and are sure to do a good deal better in the near future."

Automobiles in Central Park

FOR some time past electric automobiles have been allowed to make use of the parks in New York City. This privilege was, however, until May 3 denied to the steam and gasoline motor vehicles. On the date mentioned the Park Commissioners decided that from that date forward all automobiles could enter the parks.

The following resolution was adopted by the commissioners:

Resolved, That, pursuant to the provisions of Section 610 of the Greater New York charter, the ordinances applicable to the ordinary uses of the Central Park, adopted March 31, 1873, Section No. 4, amended November 2, 1899, by the addition of the words:—

> No horseless carriages or motor wagons shall enter or go upon the drive except by permission of the department,

is hereby further amended by striking out these words and substituting the following:

> No automobile or horseless vehicle shall be driven upon or over the drive at a greater rate or speed than seven miles an hour, and on meeting a horse-drawn vehicle, or an equestrian, this rate of speed shall be reduced to three and one-half miles an hour until the horse-drawn vehicle or horse has been passed; except under the provisions of a permit issued by this department.

President Clausen, in speaking of this decision, said that the permits already out would not be recalled, but that the holders of the permits would not come under the restrictions applied to the others. The reason of this, the President said, was that the present holders of permits, about two hundred, had electric machines, which had not been

regarded by the board as dangerous or likely to frighten horses. The restrictions, he said, were designed to apply to gasoline or steam automobiles.

Of the clause calling for a speed of seven miles per hour, Commissioner Clausen is reported to have said that its object was to lessen the danger of runaways and accidents. It seems the steam automobile was particularly aimed at. He also is reported to have intimated that the rule might be modified as soon as the steam automobile had been allowed on the park driveways long enough to let the horse become accustomed to it. There does not seem to be any good reason why a horse should be afraid of a steam carriage while in the park any more than when in the street.

Labeling of Motor Carriages

ON the morning of Saturday, April 27, at the corner of Fifth Avenue and Fifty-eighth Street, a collection of automobiles might have been seen. A sign painter was observed to go from one carriage to the other, and with but little ceremony apply to them the initials of the owner. The color selected was red, and the letters were made in a hurry. To one not familiar with automobiles or automobile legislation this had no meaning, but to the initiated all was clear. Only a few days before Governor Odell had signed a bill, one provision of which makes it necessary that the owner's initials must be painted upon his carriage. What is more, the letters must not be less than three inches high. This fact accounted for the hasty decorative work of that Saturday morning.

Just a word as to this "labeling" of automobiles. It does not seem to us as though it were necessary nor yet wise. It is clearly a matter of discrimination against the auto. Why should automobiles be be singled out? Such a law does not apply to other types of carriages. Surely such a law is not imposed on the ground of automobiles being any more dangerous than other modes of conveyance. It is admitted on all sides that an automobile is more under control than horse-drawn vehicles and can thread its way through crowded thoroughfares much more easily.

To a great many this labeling is repulsive, and it would seem to us that if a motor carriage is fitted with good and efficient brakes, bell, horn or whistle or other suitable signal, that they shall show un-

obstructedly in the way the vehicle is going two white lights ; that they shall show one red light in the reverse direction ; that they shall stop on signal from drivers; that the owner file in the office of Secretary of State his name and address, with brief description of his vehicle ; all of which is called for by the text of the bill, he has done about enough and could be traced without much difficulty in the event of violation of any phase of the law.

Automobiles for the Transportation of Freight and Passengers

W. H. MAXWELL, JR.

IN considering the question of the commercial automobile it is more than interesting to inquire as to the availability of the motor carriage for general transportation work. Allied as the problem is to railroading, we find that there are many points in which an automobile service must have certain favorable conditions before it can become practical.

The nearest approach to large public transportation lines in this country operated with motor carriages are the electric cab companies which were started and run in New York, Chicago, Boston and Philadelphia. In two of these cities the services proved themselves to be commercial failures. As to the financial success of the New York and Philadelphia corporations there is no positive way of finding out except through the quotations of their securities on the different exchanges.

A word as to the Chicago and Boston companies. There is not a bit of doubt in the world that under reasonable conditions as to roads the electric vehicle can be run commercially, and that means for a smaller expenditure than a similar horse service. The conditions of roads, etc., under which the New England and Illinois transportation companies operated were unreasonable in the extreme. Chicago

has probably the worst paved streets of any large city in the United States. It is an acknowledged fact that more trouble is experienced by operators of all makes and kinds of automobiles in Chicago than in New York or Philadelphia because of the rocking given the vehicles caused by running over the uneven pavements. The same poor conditions as to streets exist in Boston except in a slighter degree. In New York and Philadelphia better results are obtained in these public cab services because of the higher grade of pavements.

The experience of these cab services shows one thing plainly—that the future of the commercial automobile is unalterably tied up to the improvement of the pavements wherever it is to be run.

Taking the proposition from the point of view of reason, what do we find? In our large cities, and indeed all over the country, millions of dollars annually are being put into the development of the facilities for the carriage of passengers. Trolley lines are being projected and constructed wherever there is the slightest opportunity of showing a dividend on the funds invested. Clearly, with all the energy and capital which are being put into this field, there is but little chance for the passenger automobile to compete with the electric cars except in such localities where the original cost of constructing the road is so heavy as to render it unproductive of profits, and in sparsely settled districts where the traffic is not sufficiently heavy to justify the outlay necessary to construct a road.

What are the facilities for the carriage of freight in our cities and rural districts? We find this work almost entirely in the hands of a large number of persons with small means for carrying on their business, and under the actual necessity of grinding out of their labor as large a return as possible in order to live. Naturally, the cost of such freight and goods transportation is excessive, and much higher than it would be if carried on under a modern and highly organized system. As a sample of this excessive cost it is well to illustrate the point by stating that a number of tons of merchandise were shipped from Liverpool to New York at a smaller cost than it was necessary to pay for their transportation from the docks in New York to the Borough of the Bronx.

Guided by a study of the experiences of those automobile transportation companies now in the field we find that had they taken up the carriage of merchandise rather than attempting to compete with the highly organized system of carrying passengers now in vogue all over the world, their success would undoubtedly have been much

greater. Many reasons lead us to this conclusion. When one wishes to go to a place the desire is to reach one's destination with the greatest speed and with the smallest amount of inconvenience. It has taken years to develop the present system of passenger transportation and it is not to be expected that a competing system could be developed in a comparatively short time. While the carriage of passengers is at this high point of efficiency, the carriage of freight for the short distances is effected in the same way it was accomplished hundreds of years ago. True, our express companies attempt to handle the lighter freight under an organized system, but the bulky products are left to arrive at their destination whenever they can. Animal power, the world over, is being superseded by machinery, and no field has been so neglected as that of carrying freight in the suburban districts of our large cities or in places where there are no adequate railroad facilities.

On what does the success of an automobile freight or passenger service primarily depend? There is but little doubt as to the proper answer to this query, and the words "*good roads*" seems to meet it completely. No agent was ever more potent in obtaining the construction of good roads than the bicycle. The motor carriage and wagon have now come into the field to continue the good work, and there seems to be a response all over the country to the crying demand for better highways.

A careful examination of the means which have been taken to solve the problems which confronted those who have given us our great systems seems to point to the development of the central power station as the most economical and efficient mode of developing transportation systems. In this way the high cost of skilled labor for the operation of the motive power is reduced to a minimum. The centralization of the means for generating the motive power has been followed out to almost its final conclusion in the electric power station. One charge up to the present time has not been reduced, and that is the cost of building and maintaining a proper roadbed. Nor can it be so long as rails and ties are required to furnish the level on which to run a train or a car. A saving in this part of the transportation problem of equal proportion to that obtained by the establishment of the central power station would be much greater than is now obtained by these same stations. Vast sums of money have been spent in the construction of metal highways on which to carry the traffic of the world. A general awakening as to the great economic waste of this system is already taking place, and every year greater appropriations

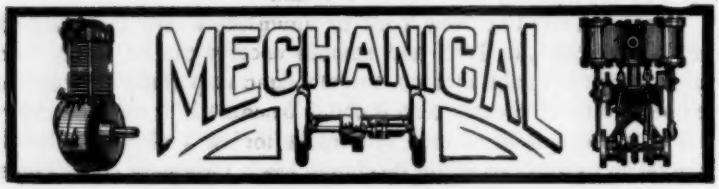
are being made from the public treasuries to carry on the improvements of the highways.

Taking a city like New York or any place where the roadbeds are, in most cases, as level and smooth as they can be made, there can be but little doubt that an automobile transportation system can be operated more cheaply than it could be done if it were necessary to maintain a system of rails and tracks. New York City is hardly as good an example as might be chosen when passenger traffic comes to be considered for the reason mentioned above—the competition of highly organized trolley systems already in vogue—but there is little room to doubt that freight can be carried more cheaply by automobiles than can be done in any other way.

For example, take the fine macadam roads on Long Island and in northern New Jersey. It would be impossible for any railroad system to compete financially with a motor vehicle line which was equipped with vehicles that could make a comparatively high rate of speed over those highways. The reasons for this are that those operating the automobile lines would have no fixed charges to pay on the maintenance of roadbeds. For the carriage of freight such a system would be much more available than a fixed route which nessitates the transhipment of the goods at the end of the route before they can be delivered to the final destination.

There is no doubt but that there are insuperable objections to a passenger automobile line where extremely high speed is desired, but there can be no question of the commercial availability of the automobile for the carriage of freight and passengers—where either the cost of construction of a roadbed for a railway is so high as to render doubtful the commercial success of the project, or where the traffic is so light as to make it impossible to pay a decent dividend on the investment necessary to construct such a road.

In 1890, the weight of a storage battery, capable of driving a motor carriage, was 2,268 pounds. To-day batteries weighing but 728 pounds are made, which will propel a carriage about twice the distance.



The Final Automobile

HUGH DOLNAR

V.—Frame and Running Gear.

As to what materials it is best to use in the wagon frame and wheels, there is yet a very marked difference in opinion shown. Wooden wheels have strong advocates, and are largely used. No one has brought out an all-wood wagon frame in the present mechanically driven road wagon revival. The old builders, 1825 to 1837, depended mainly on wood for their wagon frames, following coach-building practice pretty closely. Wood has a great many advantages in the way of stiffness, toughness and elasticity, and the simple fact that almost none of the horse-drawn wagon builders have attempted to introduce an exclusively metallic construction, is abundant proof that wood is not a wholly unsuitable material for road wagon construction. It is true that tubular steel frames for horse-drawn wagons of the lighter class have been patented, and are used to some extent, but outside of this one type of light steel frame road wagon to be drawn by one or two horses there has been no serious attempt made to introduce steel tubing in ordinary road vehicle construction, and wood continues to be regarded as the principal material used in wagon building, although when a modern first-class wagon or carriage is examined in detail, it at once becomes apparent that wood is employed mainly to obtain stiffness, and that strength is gained by an elaborate system of bracing with metal. The early railway engines used wood largely in their framing, but this material has now almost wholly disappeared from the locomotive, save in the cab. Railway freight and passenger cars continue to be made of wood, although the pressed steel freight cars bid fair to wholly displace wooden freight cars.

Our early ancestors, the tree-dwelling monkeys, who found safety and comfort among the branches of their habitations, endowed the

whole human race with an hereditament of liking for wood which cannot be effaced or ignored. Wood is the most agreeable of all materials to the human hand, and we cling to its use and employment to this day as firmly as did our simian forebears as they swung themselves from high tree branches and chattered defiance and scorn to their earth-walking enemies. But in spite of the many virtues of wood and our inborn liking for it, timber of every sort and degree has a multitude of faults as a structural material. It varies in form and dimensions, shrinks and swells, is uncertain in strength and construction, and is subject to hidden decay which reduces its power of resistance to zero. Were some kinds of wood always at their best, then indeed we might look to see the final automobile built of wood in large degree, but it is perfectly understood by all wooden vehicle makers that only the most careful selection and treatment of timber can give any hope for durability to their work. Steel, quite to the contrary, if protected against rust and loaded well within its elastic limit, and used under the ordinary conditions of rubber-tired road wagon service, will retain its strength indefinitely.

This single quality of unchanging strength in steel, seems to make it certain that steel in the form of tubes will be the principal construction material of the final automobile frame, and that the wheel will have steel hubs, spokes and rims. This assertion is not upheld by present practice. The wire spoke wheel is very speedily destroyed in city use by rubbing the spokes against the curbstones when the wagon is run close in to the sidewalk, as must be constantly done, and steel wheel rims crumple up in unsightly and distressful scallops on rough pavements, and the use of the wood wheel seems to be gaining favor for all except the very lightest wagons.

Brazing is not an absolutely certain mechanical process, because the finished product cannot possibly be inspected, and brazing is the best and only practicable method known by which steel tubes can be pieced up into a wagon frame.

When angle iron of L or C section is taken as the material for the wagon frame, the parts can be joined by welding or riveting, as may be most convenient, and the structure can be stiffened by braces easily applied at any point, without the elaborate "joints" which are needed when a brace is to be fastened to a steel tube, and the angle iron frame can also be reinforced with wooden pieces, screwed or riveted in place. These possibilities are bringing angle iron wagon frames into strong favor with many constructors. Where the motor

and transmission elements are distributed along the whole length of the wagon frame, which may be said to be the usual practice, the broad angle iron frame, reinforced with wood stiffening, offers many advantages in the way of easy patchwork construction. At the present time, because the motor requires frequent attention from the driver, many constructors place the motor in front in a thick dash board, and chains and gears are located all the way along the frame from the front axle to the rear axle, which is almost invariably made the driving axle. Nothing can be said truthfully against the welded or riveted angle iron frame stiffened with metal braces. Where wood is used to reinforce the angle iron frame an uncertain element is introduced which is a possible source of failure at wholly unexpected times, although careful selection of the timber employed makes this contingency of failure a remote chance. In the case of the brazed-up steel tube frame; the structure must be accurately planned from the first, as it is not easy to patch things on a tubular frame here and there as may be thought advisable as the construction proceeds, and a slovenly haphazard constructor finds the angle iron framing much more to his liking than the brazed-up steel tube frame. The truth of the matter seems to be that no road wagons are as yet really in well organized manufacture, which alone can produce absolute duplications, but that all of the wagons now made are to a considerable extent individual structures, not absolutely uniform in all dimensions, but subject to variations at points where easy assembling may demand a small change. While exact repetitions continue to be thus avoided, the angle iron frame will retain its followers. When types of wagons are fully and uncompromisingly adopted, and makers are beyond the period of change in minor details, then it will be commercially possible to fit up the frame department of the factory with elaborate brazing jigs, so that accurate repetitions of steel tube wagon frames can be cheaply produced. As to the relative merits of brazing, welding and riveting there is little to choose. All three are good methods, sanctioned by constant use in the most important branches of metal working and construction. While brazing is possibly the least certain of the three specified methods of uniting two pieces of metal, one has only to look at the vast number of cycles in use, many of them very low priced, and to reflect upon the extreme rarity of brazed joint failure in cycle frames to become fully convinced that brazing, in spite of the impossibility of inspection, is very far from deserving the reproach of unreliability, and that it may be safely classed as a good method of joining wagon frame members.

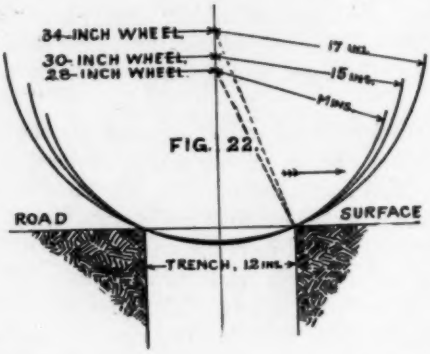
When weight for strength is considered, the steel tube wagon frame, with brazed joints must stand in the foremost place, and the day will surely come when both makers and users of mechanically driven road wagons will fully understand that every pound of wagon beyond what is needful for safety should be avoided. There are now, comparatively speaking, but very few automobiles in use. It is commonly thought that a great number are worked in France, but the government enumeration of French automobiles for 1900 gives a record of only about 5,000 in use, all told. Here in the United States, outside of the Stanley wagons, the "Locomobile" and the "Mobile," very few wagons, indeed, are running. The Stanley wagons are very light, and have steel tube frames, brazed, and so far have shown extremely few frame failures, or none at all.

It seems likely that angle iron framing will continue in favor for a long time, with a strong probability that when really established types of wagons appear, the advantages of the steel tube brazed up frame in the way of strength and lightness will bring it into very large use.

Wheels, wheel material and wheel diameters show so far a very large divergence in opinion among wagon makers, so large that it is impossible at this time to assume the existence of any established practice. While it is obvious that for manufacturing convenience all wheels of the wagon should be of the same diameter, it is a common thing to see the front wheels made two inches or four inches smaller in diameter than the rear wheels. This practice comes, unquestionably, from the difference in the diameter of the front and rear wheels of horse-drawn wagons. There is no case in which the functions of the wheels, viewed as either carriers or drivers, need smaller diameters in front than in the rear. Without a doubt the larger the wheel diameter the better, so far as easy running and riding go, and both front and rear wheels should be as large in diameter as may be.

In passing an elevated obstacle on the road surface all diameters of wheel have an equal rise. In passing depressions of the road surface, the larger wheel has much less the advantage than is generally thought. Thus, in Fig. 22, wheels 34, 30 and 28 inches diameter vary only enough in extreme fall to thicken the line at the bottom as shown, there not being much more than ⅛ of an inch more drop in passing a trench 12 inches wide with a 28-inch wheel than with a 34-inch wheel. This diagram also shows that a 34-inch wheel has only a very small advantage over a 28-inch wheel in the lift angle, when leaving a road surface depression 12 inches in width.

When strength, weight and cost of wheels are taken into consideration all of the advantages are in favor of the smaller wheel diameter, and wheels as small as 26 inches are quite largely used in French construction, while the best known of our American steam wagons use 28-inch wheels, bicycle diameter. From these smaller diameters the automobile wheels go upward to 36 and 38 inches, and even more in some cases, requiring more weight, and involving a vastly increased pneumatic tire cost. A 28-inch wheel answers all of the working requirements of the passenger wagon, and there seems to be no real advantage gained by the use of a larger diameter. There is a great gain in steadiness and easy riding to be had by extending the wheel base; 72 inches is none too much for this dimension, though many makers stop short of 60 inches, and skimp the wheel gage also. If



the gage is made standard, 56 inches, or say, with 3-inch tires, 51 inches from center to center of the wheels, it is believed that it is harder to steer a wagon out of street car tracks in town, and out of the ruts made by our narrow tired 56-inch gage wagon wheels in country roads, than if the wheel gage were made, say, 50 or 52 inches, so that the wheels on one side of the wagon only will be held by the trolley track or wheel rut. If we ever have fairly good roads, the wheel gage of the automobile will not be a matter of great importance, and 48 inches or over will do fairly well, though increased gage width gives increased stability in turning corners. With roads as they now are in almost all of our country districts, 56 inches wheel gage runs much more easily and smoothly than anything else, although the objection of difficulty in turning out of the ruts or tram

tracks is undoubtedly of some weight. Pneumatic tires, however, climb out of ruts and car tracks with an ease and readiness which is really surprising, and there seems to be nothing really gained by making the wheel gage less than will bring the tires, say, 55 inches from outside to outside, or with 3-inch tires, 52 inches wheel gage, center to center, which permits the wheels to run freely between tram metals and in the smoothest track of the mud roads which are the rule in the country.

So far we have no established practice with power-driven trucks and heavy-load carrying wagons, for the simple reason that almost no such vehicles are in use. There seems to be no possibility of using anything but wooden wheels with steel tires for heavy work. Solid rubber tires show far less endurance under heavy loads than pneumatic tires, unless they are made of enormous thickness. If memory serves correctly, English traction engines for road work have been fitted with solid rubber tires as much as 11 inches wide by 7 inches thick, which gave excellent results, as might well be expected. But probably no truck builder would be willing to incur the expense of solid rubber tires of sufficient width and thickness to safely and durably carry a load of say a ton and a half or two tons per wheel, as truck service demands, and hence the wooden wheel and broad and thick steel tire seem unavoidable for this class of work.

From a manufacturing point of view, and functionally as well, wheels for vehicles up to 1,500 pounds weight all on, should have wire spokes, steel rims and pneumatic tires, and should be 28 inches diameter, no more and no less, and all four of the wheels, hubs, spokes and rim and tire, should be exactly the same, so that the wheels will interchange and only one size of each part is needed. This makes the cheapest production and also gives the most economical tire service, because the tire wear and stress is vastly less on the front wheel than on the rear driver and tires which are worn out as drivers are yet capable of long-continued use in front. A 28-inch wheel with, say, 5 inches spoke base and wire spokes of about 3-16 diameter cannot fail in service under a 1,500-pound wagon, and there seems to be no real objection to the use of these dimensions. A low center of gravity is extremely advantageous from every point of view save that of dust on crowded roads, and there seems to be no doubt whatever that advantages of both manufacture and use will force all alike wheels of small diameter to the fore and keep them there. A front and rear wheel diameter variation of two or four inches is a manufacturing

absurdity and is certain to disappear when power-driven wagons come to be extensively used.

The flexibility of wagon frame needful to give all four of the wheels their proper bearing on an uneven road surface, is obtained in two ways. The frame can be made limber enough to give the wheels an individual rise and fall of 10 or 12 inches, or the frame and rear axle support can form one comparatively rigid member, to which the front axle is pivoted so as to rise and fall freely at either end. Where the frame is made flexible the springs between the frame and wagon body do much to alleviate the twisting of the body ; in case the front axle is pivoted to the main frame, all of the tendency to twist the body is avoided, and the durability of the body and the stability of all the running parts supported by the body are greatly increased. It seems to be a very decided error to support any part of the driving mechanism on the wagon body ; all of the running parts should be carried on the under frame, and the front axle should be made to rise and fall freely at either end. Practice in these particulars is, however, divided by strongly marked lines, some makers fastening the greater part of the driving elements to the wagon body, while the majority support nothing save the hand levers on the body of the wagon, and a few depend on the body to carry the passengers only, nothing in the way of machinery being fastened to the body, which is made to be readily removed without disconnecting any machine parts whatever.

Viewed simply as a machine, it is both better and cheaper to carry all machine parts on the frame. There is, however, no serious objection to attaching minor parts to the wagon body, but it seems very decidedly better to support all of motor parts and levers on the wagon frame and it is not a very difficult thing to do this in a satisfactory manner. As previously specified in these papers, the ideal construction is to bring all of the driving parts, motor, gear and everything else as closely together as possible, and mount this whole assemblage of motive elements on a single rigid frame connected to the driving axle by radius links and balanced on a single flat spring placed crosswise of the wagon and suspended by links from the two reach members close to the points where they support the rear driving axle. Some of the electric wagon motors and gearing are now so arranged and supported, the flat cross spring greatly ameliorating road inequality blows on the rear wheel tires. The internal combustion motor-driven wagon makers do not favor this rear location of the motor. They believe it impossible to build a motor sure to work if

not constantly under the driver's supervision, to see that oiling and a lot of other functions are properly performed, and hence, prefer to place the motor in the extreme front, seating the driver close in the rear of the motor and making the gilled or winged water-cooling pipes the leading feature of the wagon. Until motors are made certain in operation, perhaps this extreme front motor location is the best that can be found, although it necessitates a lengthy power transmission to the rear axle, and either places these transmission elements too near the road surface or fills up the possible carrying space of the wagon body.

Steering is almost invariably effected by mounting the front wheels on short axles arranged to swing to the needful angles, a construction dating from about 1830. The ideal steering arrangement of the axles pivots both front and rear axles in the middle of their length, and turns both axles. An English wagon has been shown with both axles thus pivoted, which ran smoothly and well with the inner wheels describing a circle of only seven feet diameter. Swinging the rear axle used as a driver involves disagreeable features which will probably prevent a large employment of this feature, no matter how desirable it may be functionally. Driving all four wheels falls in the same class: it is without doubt very desirable to drive all the wheels of a road wagon, but the simplicity gained by using the rear wheels wholly for driving and the front wheels for steering only, is not likely to be soon abandoned for the sake of even a very considerably improved action involving increase in number of parts and complication of driving elements. Builders are more nearly agreed on rear wheel driving and front wheel steering, with the front wheels carried on short axles, than on any other important detail of wagon design, and it now seems almost certain that this is the final arrangement. It is not probable that any form of tricycle will ever become popularly acceptable, and that form of four-wheeled wagon construction which consisted essentially in fastening two bicycles together side by side, has been pretty well tried out by Hertel, in the Oakman wagon, and it seems that no arrangement for a four-wheeled vehicle which places the steering wheels in swivelling forks will answer, although the double bicycle construction gives an excellent distribution of frame material, and Hertel's wagon of 1895, which could sometimes carry two passengers at a fair rate of speed and weighed only 225 pounds, was a remarkable construction, yet nothing in the way of vehicles has ever yet approached the miracle of the bicycle, carrying as it does safely and well

a rider of say 150 or 175 pounds on a structure of about 25 pounds total weight, which is something like sixty times the total paying load effectiveness of the best electric wagons, or sixteen times as much paying load to vehicle weight as the Stanley steam wagons show. Duryea, a pioneer in American road-wagon building, is persistent in his endeavors to popularize his well-designed and well-built three-wheeler, and a Springfield-built tricycle for two passengers attracted much attention at the last Madison Square Garden show. While the tricycle can be made small and light and can be handled in a small space, it does not suit the taste of many people and it is very little if any cheaper to build than a four-wheeler and certainly lacks stability of support in turning curves; the single steering wheel must be very strong and extremely well supported to make the vehicle anything like safe, and taking everything into consideration, it seems not too much to say that the fork-carried steering wheel is hopelessly out of the running, and that no form of tricycle will be prominent among the final types of the automobiles.

In steering devices the wheel stands first in European estimation, while the lever is preferred in America. For heavy wagons the wheel must be used, with a tangent worm and a segment of worm gearing interposed between the hand-wheel axle and the steering wheels. No other elements have sufficient strength and friction to cope with the great strains set up by wheels loaded to a thousand pounds each and upward.

For light wagons, where the individual wheel load does not exceed 500 or 600 pounds and falls as low as 200 or 300 pounds, lever steering is both safe and convenient and is vastly more effective for a given application of muscular effort than the wheel. This becomes at once evident when the radius of leverage at which the driver's power is applied is considered. A steering-lever radius of say 18 inches, which is about the medium of our practice, is equivalent in effect to a steering-wheel diameter of 36 inches, and as steering wheels are usually made under 12 inches in diameter, it is very clear that the hand of the driver has much more control with the long steering-lever radius than with the short hand-wheel radius. Since the driver can apply both hands to the steering wheel and can give the steering wheel as many turns as may be desired, it is of course possible to steer any vehicle with a wheel, but a lever is certainly much the more convenient of the two devices, and much the quickest in action, and the lever uses only one of the driver's hands, and the driver should certainly be

called upon for as little work as possible of any and every description. Wagons are made which provide constant employment for both of the driver's hands and both of his feet, levers and treadles being used which make the wagon safe only when both hands and both feet are in working position. The driver's eyes must watch the road, and if sight-feed lubrication is used the driver must watch the oiler also, and many of the steam wagons require the driver to watch the water-gage

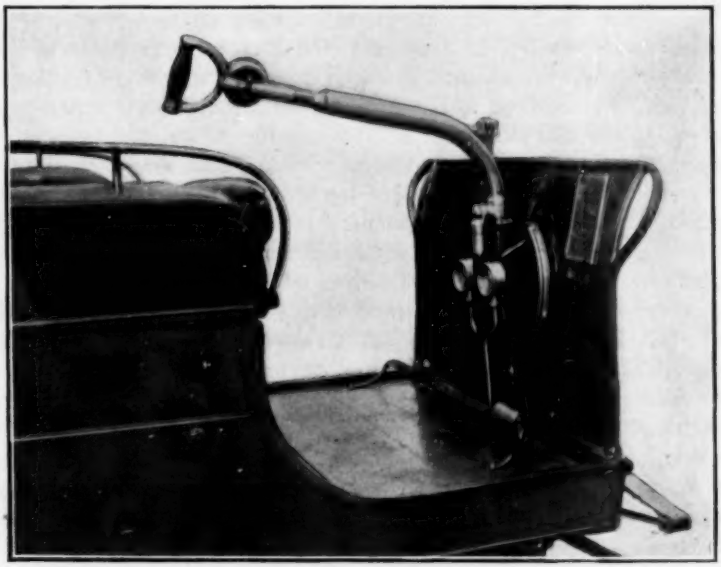


Fig. 23—Whitney's Combined Steering, Link Shifting and Throttle Valve Controlling Lever

glass, and he must also be constantly listening to the small noises made by the motor running parts to obtain prompt knowledge of any derangement in their action. When a driver takes a run with a wagon making these demands on his hands and feet and eyes and ears, he has very little opportunity left for enjoying the scenery disclosed by his rapid progress, and his task becomes extremely fatiguing, especially as he is obliged to confine himself to one position. Wagons are made with several hand levers, one for each principal effect to be gained ; it is common practice to use such speed-changing elements in the way of gears, clutches and clutch levers as to call for great skill

in their handling on the part of the driver to make them work. So far as speed changes go, friction engagements which can be effected at any speed and with no skill on the driver's part, are well known and must soon displace the barbarous sliding gears used almost exclusively by European makers, which often cannot be thrown into action by even the most expert drivers. It seems impossible that such wholly inadequate speed changing mechanism should be tolerated for a moment, but the broad fact remains that it is the rule in French, German and English practice where belts are discarded in favor of gear transmission. Both belts and chains have inherent faults as elements of power transmission in wagon driving, and toothed gearing is universally recognized as far more certain and reliable in action than anything else that can be used. The continental wagon makers seem as yet to be wholly unable to use the friction clutch in any satisfactory manner, although a great many forms of friction clutches are constantly used in American machinery of all descriptions without any working trouble whatever. Not being able to use friction clutches with certainty and comfort, belt-driven wagons, all substantially of the Benz construction, continue to find advocates and users, because with the belt drive speed changes can always be made by any driver. although no belt drive, no matter how carefully it is designed, can ever be made right for road wagon use. Chains, although so very largely used both in steam wagons and with internal combustion motors, are vastly inferior to toothed gears for automobile use. The great cost of a really good chain and its inevitable length variations make the chain highly undesirable, and the multitude of parts which the chain must have, all in constant wear, and any one of them liable to fail at any moment and so stop the wagon until repairs are effected, makes chain transmission fully as uncertain as belt transmission, or perhaps, even more uncertain than the belt. The chain remains in use solely because it takes up very little room sidewise for its strength, and because it can be used with much less accurate placing than toothed gearing requires, hence, the chain will run where want of rigid support makes the use of toothed gears impossible. Beveled gears are always to be avoided, and have no place whatever in wagon driving. Spirally toothed gears, either on parallel axes or on axes at right angles to each other are the only transmission elements fit to use, and the worm gear transmission is about as flexible as chain transmission, and has none of the chain objections. Spiral gearing, either in the form of spur gears or with shafts at 90 degrees, and properly pro-

tected and lubricated, is absolutely certain to be the only transmission element employed in the final automobile.

How many levers should an automobile have? Suppose a wagon to have no speed change, but to drive as a locomotive drives, except that the motor turns in one direction only ; then the driver must steer the wagon to right or left, must cause the wagon to run backward or forward at will, and must regulate his fuel admission to the motor, and must advance or retard the spark-ignition time. Here are four functions, to steer, reverse, regulate the fuel and regulate the spark time. In addition, there must be a brake-applying means for light effects, and a heavy brake for emergency use, making a total of six separate actions requiring individual mechanical instrumentalities through which these various operations can be performed by the application of the driver's hand. Shall the wagon have six different levers, treadles or handles, or shall the levers be so constructed as to combine as many of the functions as possible in a single lever, variously manipulated to produce the various effects required?

Whitney, who was first of the late American steam wagon makers, was one of the first to show effective combined steering and motor controlling lever. Whitney's arrangement, Fig. 23, has a spade-handle grip mounted at the inner end of the horizontal lever, and without letting go of this grip the driver can steer the wagon and run the steam motor backward or forward. Whitney's lever has a swinging horizontal movement for steering, a back and forth telescoping movement of the grip carrying rod for working the links, and the grip has a rotating movement by which the motor throttle valve is opened and closed.

Duryea has a combined lever for his internal combustion motor wagon, which steers, drives backward and forward and governs the spark time. The Stanley wagons use a simple hinged steering lever, with separate levers for the throttle and for shifting the links. The continental and English builders use wheel steering, with separate levers and treadles for each separate action required. A Canadian steam wagon was shown with no less than seven hand levers for the driver to choose from in case of an emergency.

It seems obvious that the combined lever is the least burdensome and the least confusing to the driver. If there is but one lever, engaging one of the driver's hands only, it is certain that the driver cannot grasp the wrong lever by mistake, and if this lever controls the direction of motion of the wagon by friction clutches, then without

moving his hand from the lever grip the driver can steer the wagon, reverse his direction of travel, govern his fuel consumption and the spark time, and also, by shifting the clutch friction, give a strong brake action, all with this one lever.

A late example of such a combined steerage and governing lever is shown in United States patent 671,947, April 16th, 1901, of which two illustrations are here given. Although this lever is quite simple in exterior form, being merely a straight normally vertical steel tube, mounted on a rocking shaft, and having at its upper end a hand grip, surmounted by two small wheels, a complete description would re-

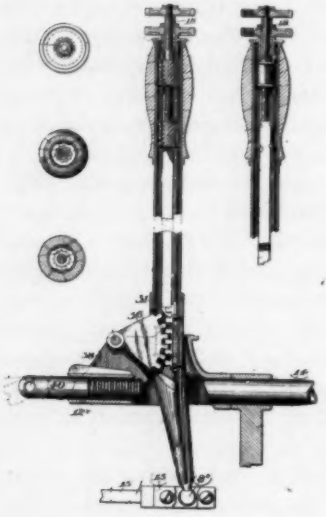


Fig. 24

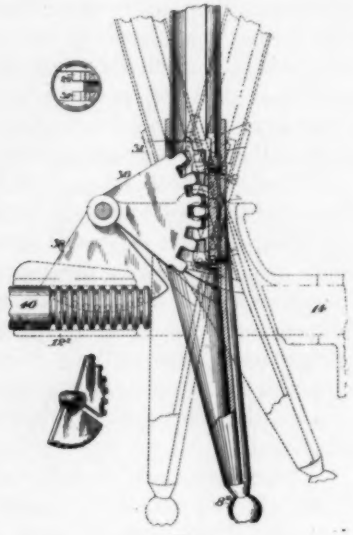


Fig. 25

quire many engravings and more space than can be given here. A fair understanding of its mechanism can, however, be had from the two illustrations reproduced, and the following summary of its actions: The steering is effected by rocking the shaft 14 by pulling or pushing the lever, which stands in the middle of the wagon close to the edge of the front seat, to left or right. The lower end of the lever is prolonged below the rock shaft, and terminates in a globe end, 8^2, to which is jointed the reversing rod, 15, which causes the wagon to run forward when 15 is moved to right, and backward when 15 is moved

to left. The small finger and thumb actuated wheels above the grip move two quick pitch multi-threaded screws in the body of the lever, and these screws cause their nuts to rise or fall, each nut being fixed to a separate rack, 31, engaging a segment of gear, 36, which carries a pin-toothed segment, 38, these pin-toothed segments driving half cylinder racks, 40, seated side by side in the tubular guide way, 12^2, axially in line with the rockshaft, 14, which supports the lever. By this arrangement of parts the lever is enabled, first, to rock the shaft, 14, and so steer the wagon ; second, to move the clutch rod, 15^1, back and forth, and so make the wagon run forward or backward, and third, also to produce a brake effect by friction on the backing gear clutch when the wagon runs forward, and the contrary ; fourth and fifth, to move the twin racks, 40, back and forth, one of these racks, 40, being connected to the fuel regulation, while the other is connected to the spark advancing and retarding movement. Any one of the functions of this hand lever can be effected without disturbing any of the existing adjustments of the other function controling parts, and everything is always in positive engagement, while all of the parts are always in readiness for action without the use of any clutches, catches, latches or springs, precisely as if each action were governed by a single simple lever of its own.

Several rides of some extent with Whitney driving one of his own steam wagons controlled by his single combined lever, fully convinced the writer that the combined lever is far superior in point of certainty of action to the several independent levers commonly used. These rides embraced running both in the narrow and overcrowded streets of Boston and in the country, and Whitney drove under all conditions with absolute certainty and self-possession, even under surprises and in the seeming certainty of collisions, which, however, never occurred.

It seems certain that the fewer the levers the driver has to choose from, the less his liability to error, and that when he has but one single lever to control, and that lever always in his grasp, his chances of wrong action are reduced to the lowest possible point, and that because of all this, the final automobile, be its frame and motor and transmission gearing what they may, will have only one controlling lever, so constructed as to govern all of the events of ordinary travel.

The Automobile Index

Everything of permanent value published in the technical press of the world devoted to any branch of automobile industry will be found indexed in this department. Whenever it is possible a descriptive summary indicating the character and purpose of the leading articles of current automobile literature will be given, with the titles and dates of the publications.

Illustrated articles are designated by an asterisk (*).

Alcohol in Automobiles, Employment of—

Translations made especially for the "Automobile Magazine" and dealing with results of trials conducted in France the latter part of 1900, the official reports of which, however, have just been given out. "Automobile Magazine," New York, May, 1901.

***Amateur, The Automobile and the—**

Gives, in a popular style, points regarding the different types of carriages. "Saturday Evening Post," Philadelphia, May 11, 1901.

***Bicycle, How to Build a Motor—**

No. 16 of a series of articles giving detailed information and working drawings of a 1½ horse-power bicycle. "English Mechanic," London, April 19, 1901.

***Bicycles, Motor—**

By A. J. Wilson. Instructions for operating motor bicycles, taking up the various types of wheels. "Motor News," Dublin, May, 1901.

***Breaker, The De Dion Contact—**

Description of this well known form of device. To owners of De Dion vehicles this article ought to be interesting. "Motor News," Dublin, May, 1901.

***Car, The Valee—**

This is a typical French vehicle, except that the motor, instead of being carried in front is mounted just back of front axle. Two belts are used for driving. "La Locomotion Automobile." Paris, May 2, 1901.

Carbureters, Examples of—

Merely a description of a number of the leading makes of carbureters. "Automotor Journal," London, April, 1901.

***Chains, Motor Car—**

This is a strong argument for a more extensive use of chains if properly designed and protected. Gives a number of things to be borne in mind when laying out sprockets and chains. The article should be of unusual interest to those owners of machines on which chain gearing is used. "Motor Car Journal," London, April 13, 1901.

***Coo'ing System, The Lombard—**

A system by which water is admitted into the combustion chamber of explosive motors. By means of this arrangement a certain quantity of water is drawn into the cylinder at each stroke. "Automotor Journal," London, April, 1901.

***Electric Motors, Selection of—**

By C. E. F. Ahlm. The author suggests that in selecting a motor unusual care should be given based on the service in which the carriage is to run. "Horseless Age," New York, April 17, 1901.

***Empress Light Car, The—**

Detailed description of an interesting carriage. "The Autocar," London, April 27, 1901.

***Engine, The Hudd—**

A new motor, the arrangement of the cylinders of which reduces vibration to a minimum. Cylinders

are placed opposite each other, each driving its own crank. The engine is well designed. "The Autocar," London, May 4, 1901.

Fuel, Liquid—

An article devoted to a consideration of the merits and demerits of liquid fuel. The writer confines what he has to say on the subject to the marine application of liquid fuel, still he says many things which will be valuable to builders of steam wagons of all kinds in which gasoline is used as fuel. "Cassiers Magazine," New York, May, 1901.

***Gas Engine, The Letomlie—**

Description of a new French engine in which the four-stroke cycle is modified in such a way as to secure greater efficiency. "Automotor Journal," London, April, 1901.

Gasoline Automobiles, Changes in—

Editorial referring to the tendencies of builders to adopt the tonneau body and the placing of the motor in front. "Automobile Magazine," New York, May, 1901.

***Gasoline Carriage, The Hasbrouck—**

This is a 6 horse-power wheel of the char-a-bancs style, having five seats. The two pistons work on the same crank pin. It has two speeds ahead and one reverse. "Horseless Age," New York, May 8, 1901.

***Gasoline Carriage, Working Drawings of a—**

Part 8 of a series giving full directions for the building of a two-passenger vehicle. "Horseless Age," New York, May 1, 1901.

***Gasoline Carriage, Working Drawings of a—**

"Horseless Age," New York, April 17, 1901.

Gasoline, Storage of—

A series of letters from practical men giving their ideas as to how this fluid should be handled. "Automobile Magazine," New York, May, 1901.

***Gearing—**

Part 4 of an article dealing with the laying out and cutting of gears. "Horseless Age," New York, May 8, 1901.

Ignition for Automotors, Elements of Electric—

This is an article designed to clear up numerous points involved in the electric spark and its application to motors. "Automotor Journal," London, April, 1901.

***Military Automobiles—**

Part 2 of an article dealing with the recent French maneuvers in which motor vehicles were used. "La Locomotion Automobile," Paris, April 25, 1901.

***Motor Car, The Allison—**

A new vehicle carrying a two-cylinder gasoline engine. The engine power is controlled by an expansion gear, the lever to operate which is at the driver's right hand. By means of this lever the engine can be worked from zero to full power. "Motor Car Journal," London, April 20, 1901.

***Motoring, Lights and Shades of—**

Mrs. M. E. Kennard. Conclusion of this interesting story of the one thousand mile run of the A. C. G. B. I. "Automobile Magazine," May, 1901.

***Napier Car—**

Description of a 24 horse-power vehicle now being constructed for Mr. Charles J. Glidden of Brookline, Mass. "Automobile Magazine," May, 1901.

***Panhard Works, A Visit to the—**

An interesting account of this time-honored factory. The article is full of interesting facts. "The Autocar," London, April 13, 1901.

***Road Building, New York's Progress in—**

Facts and figures regarding the conditions of good roads throughout the State. "L. A. W. Magazine," Cleveland, May, 1901.

***Sahara, Automobile Trip Through the—**

Graphic account of a very romantic experience while crossing this sea of sand. Fully illustrated. "Automobile Magazine," May, 1901.

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***Show, Guide to the Automobile—**

A long article dealing with the exhibits at the Automobile Club Show recently held in London. "The Autocar," London, May 4, 1901.

***Steam Car, A 12 Horse-power—**

This is an interesting wheel in that locomotive practice is followed to some extent. The drive is direct to the driving axle by means of cranks. "The Autocar," London, April 20, 1901.

Tires, Automobile—

Abstract of paper read before the A. C. A. on this subject. "Horseless Age," New York, May 8, 1901.

***Tourand Motor Car, The—**

Full description of the motor used in the latest form of French motor carriage. "Motor Car Journal," April 27, 1901.

Truck, A Combination—

Description of a delivery wagon in which gasoline and electricity are both used. "Automobile Magazine," New York, May, 1901.

Uncle Jethro's Will—

An automobile story written by Joe Lincoln. "Automobile Magazine," New York, May, 1901.

***Valve, The "Hudd" Starting—**

This is a device to rapidly open and close the compression, thus alternately easing the compression and holding the full force of the explosion. It sometimes happens that after the compression tap is closed explosions cannot be made, although they could be obtained before the compression tap was closed. This device is designed to overcome this and to automatically ease compression and offer full resistance to the explosion. "Motor Car Journal," Saturday, April 13, 1901.

Vibration, The Effects of—

By R. W. Buttemer. A discussion of vibration, its effects and suggestions for overcoming it. "Motor Car Journal," April 27, 1901.

***Wagon, A Piano—**

Description of a very successful delivery wagon built by the St. Louis Motor Carriage Company. "Automobile Magazine," New York, May, 1901.

Wheels, On the Influence of the Diameter of on Power Required for Propelling Automotors—

By W. A. T. Müller. An approximate estimation of the various factors shown by experiments carried out showed plainly that the specific amount of power required diminished with the increasing diameter of wheels. "Automotor Journal," London, April, 1901.